

# Yerba Buena Island Ramps Improvement Project

SAN FRANCISCO COUNTY, CALIFORNIA  
DISTRICT 4 – I-80 (KP 12.3/13.2, PM 7.6/8.1)  
EA-04-3A-640K

## VOLUME II: APPENDIX H TO APPENDIX Q Draft Environmental Impact Report/Environmental Impact Statement and Draft Section 4(f) Evaluation



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Prepared for the  
State of California Department of Transportation  
and San Francisco County Transportation Authority

The environmental review, consultation, and any other action required in accordance with applicable Federal laws for this project is being, or has been, carried out by Caltrans under its assumption of responsibility pursuant to 23 U.S.C. 327.



February 2011





## APPENDIX H

### YBI TRAFFIC FORECAST AND OPERATIONS REPORT

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THE TRAVEL EXPENSES AND OTHERS REPORT

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# Yerba Buena Island Project Report Traffic Forecast Report

## 1.0 INTRODUCTION

This report presents the traffic forecasting procedures and the results of the forecasted future traffic volumes on the Bay Bridge and six on- and off-ramps to and from Yerba Buena Island in both eastbound and westbound directions.

## 2.0 EXISTING TRAFFIC VOLUMES

Figure 1 presents the existing traffic volumes on the Bay Bridge and ramps in both the eastbound and westbound directions, during both the AM and PM peak hours, respectively. Existing Bay Bridge ramp traffic volumes were collected by Fehr & Peers from May 4<sup>th</sup> (Sunday) to May 10<sup>th</sup>, (Saturday) 2008. Average traffic volumes for the three mid-week weekdays (Tuesday (May 6, 2008) to Thursday (May 8, 2008)) were selected for the analysis. The AM peak hour was identified as 8:00 a.m. to 9:00 a.m. and the PM peak hour was identified as 4:00 to 5:00 p.m. The Bay Bridge mainline traffic volumes were obtained from the Freeway Performance Measurement System<sup>1</sup> (PeMS) database for the same three days and during the same peak hour to ensure consistency. The data point is located approximately 2,300 feet west of the Bay Bridge westbound metering lights. It should be noted that the Bay Bridge traffic volumes do not represent the actual demand; it represents the actual volumes counted at this point. Westbound traffic volumes at this point are constrained by the number of vehicles controlled by metering lights during both the AM and PM peak periods, and Caltrans sets a limit of 9,600 vehicles per hour onto the Bay Bridge.

There are no metering lights in the eastbound direction in the Bay Bridge corridor. Due to the complex on- and off-ramp configuration on the San Francisco side of the Bay Bridge and chronic traffic queuing at the approaches to the Bay Bridge, the eastbound Bay Bridge capacity was estimated using the highest counted traffic volumes from the PeMS database. PeMS data were examined between 2003 and 2007 and the highest volume counted was 9,785 vehicles on April 12, 2007 between 4:00 p.m. and 5:00 p.m. Thus, it was determined that the eastbound capacity is approximately 9,750 vehicles per hour.

### 2.1 Historical Traffic Volumes on the Bay Bridge

A review of historical data published by the Metropolitan Transportation Commission (MTC) showed that traffic volumes during the AM peak period were effectively the same in 2001 as in 1991 in both the eastbound and westbound directions. However, traffic volumes during the PM peak period increased in both eastbound and westbound directions during the same time period. A recent report prepared by the MTC, *Bay Area Transportation: State of the System 2005*, shows a reduction of 4 percent in average daily traffic on the Bay Bridge in the westbound direction.

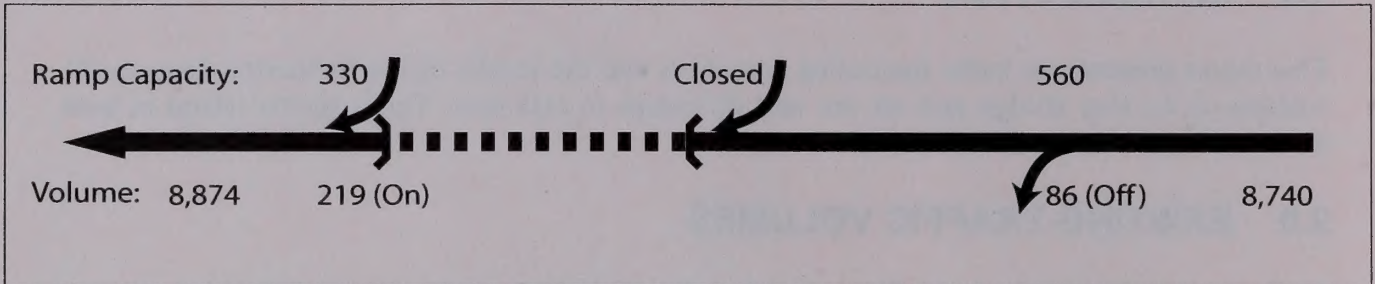
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<sup>1</sup> PeMS data were obtained from <https://pems.eecs.berkeley.edu/>

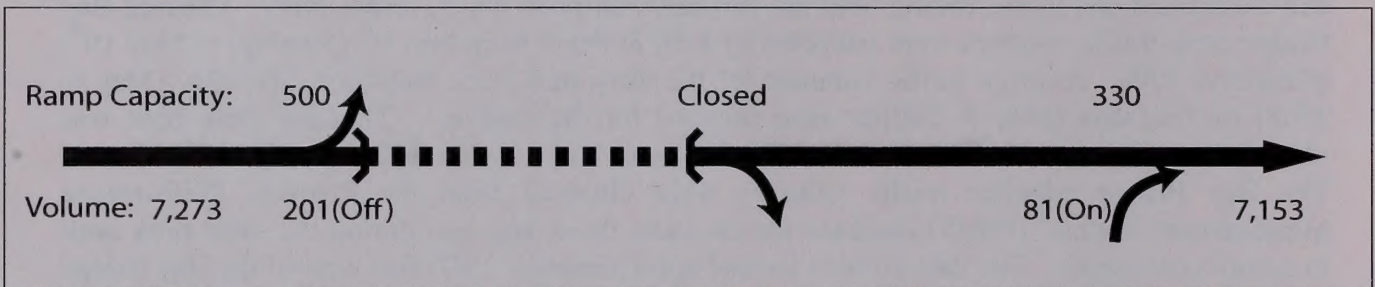


## AM PEAK HOUR

### Westbound

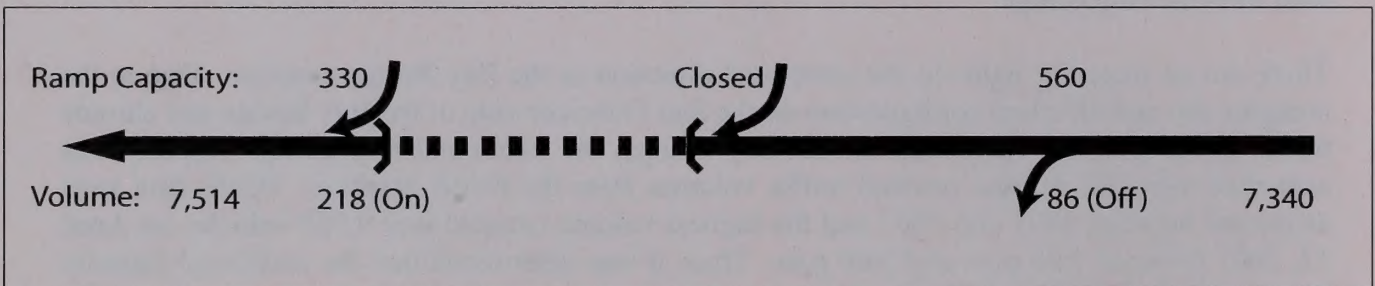


### Eastbound

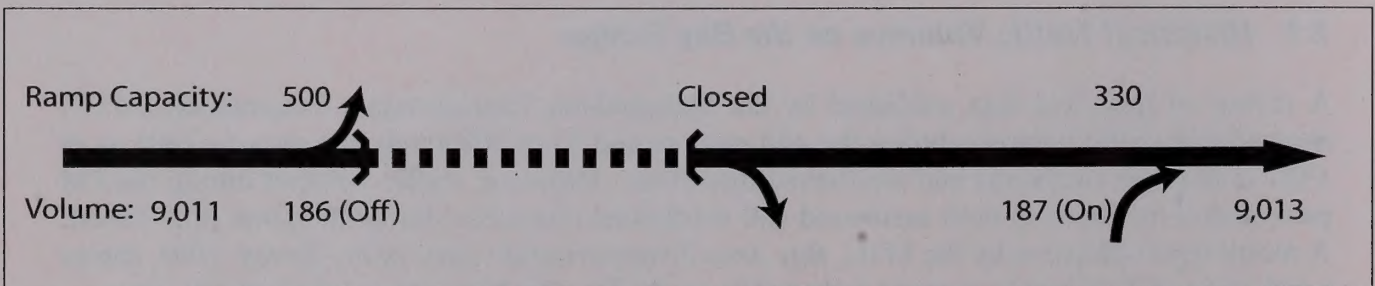


## PM PEAK HOUR

### Westbound



### Eastbound





It should be noted that Bay Bridge peak hour traffic volumes vary substantially. Table 1 presents the mean, 85 percentile, and highest volumes counted in 2006 and 2008.

**Table 1 - PeMs Traffic Data (2006 and 2008)**

	AM Peak Hour		PM Peak Hour	
	Eastbound	Westbound	Eastbound	Westbound
2006				
Mean	7,000	8,276	8,766	7,271
85 percentile	8,012	9,331	9,404	8,047
Maximum	8,552	9,571	9,777	8,493
2008				
Mean	6,838	8,759	8,853	7,195
85 percentile	7,244	9,385	9,351	7,891
Maximum	7,561	9,732	9,591	8,485

### 3.0 FUTURE TRAFFIC VOLUMES

The future year for this project is 2035, 20 years from the completion of the proposed project. Future traffic demand volumes for the Treasure Island and the Bay Bridge were estimated using two different methods and then integrated to ensure consistency. Future demand volumes for the Treasure Island were estimated based on the proposed land use program for the *Treasure Island and Yerba Buena Island Redevelopment Plan (TIYBIRP)* and was regarded as a full-build of the Treasure Island. Future demand volumes for the Bay Bridge were based on the MTC's travel forecasting model for the AM peak hour and San Francisco County Transportation Authority's (SFCTA) travel forecasting model for the PM peak hour. Both forecasting methods and integration procedures are described in detail below.

#### 3.1 Future Traffic Demand on the Treasure Island

Future traffic demand volumes for the Treasure Island development project was obtained from the trip generation report prepared by Fehr and Peers, and recently approved by the San Francisco Planning Department for use in the *TIYBIRP EIR*. Vehicle trip generation for the *TIYBIRP EIR* was calculated using the methodology described in Appendix A, a technical memorandum titled "Proposed 4-D Adjustments to Trip Generation Rates Treasure Island Transportation Impact Analysis". Future traffic volumes were estimated for the baseline transit investments only (only those funded improvements were included in the modal split analysis).

Table 2 presents the proposed land use program for TIYBIRP and estimated person and vehicle trips for the TIYBIRP under the baseline transit scenario. Table 1 (baseline transit) shows that TIYBI RP would generate approximately 2,416 vehicle trips during the AM peak hour (1,062 inbound and 1,354 outbound vehicle trips) and approximately 3,835 vehicle trips during the PM peak hour (2,136 inbound and 1,699 outbound vehicle trips) during the PM peak hour.

It should be noted that the vehicle trips presented in Table 2 are total vehicle trips that would be generated by the proposed developments on Treasure Island and Yerba Buena Island at build out, including the vehicles currently accessing Treasure Island and Yerba Buena Island and will



remain after the construction of the TIYBIRP project. The net increase in vehicle volumes would be 1,664 vehicles during the AM peak hour and 2,909 vehicles during the PM peak hour<sup>2</sup>.

**Table 2 - Yerba Buena Island and Treasure Island Redevelopment Plan Trip Generation by Mode (Baseline Transit Scenario)**

Land Use	Total Use	Person Trips					Vehicle Trips <sup>2</sup>		
		Ferry	Bus	Auto	Internal <sup>1</sup>	Total	In	Out	Total
Weekday AM Peak Hour									
Residential	6,000 units	431	526	1,405	1,387	3,749	234	838	1072
Hotel	500 rooms	100	126	352	339	917	163	103	266
Retail	270,000 sf	131	222	858	712	1,923	346	260	606
Open Space	300 acres	9	15	59	48	131	33	8	41
Marina <sup>3</sup>	400	6	8	34	29	77	11	13	24
Flex	325,000 sf	41	50	134	133	358	87	14	101
Police/Fire	135,000 sf	33	40	107	106	286	67	13	80
School		91	111	296	291	789	121	105	226
Total		840	1098	3,245	3,045	8,230	1,062	1,354	2,416
Weekday PM Peak Hour									
Residential	6,000 units	510	623	1,534	1,778	4,445	757	430	1187
Hotel	500 rooms	50	63	165	186	464	66	60	126
Retail	270,000 sf	397	669	2418	2320	5,804	895	823	1718
Open Space	300 acres	17	29	107	102	255	31	45	76
Marina <sup>3</sup>	400	9	14	53	50	126	19	18	37
Flex	325,000 sf	237	289	712	826	2064	310	241	551
Police/Fire	135,000 sf	7	9	21	24	61	5	11	16
School		90	90	138	211	529	53	71	124
Total		1,316	1787	5,144	5,496	13,748	2,136	1,699	3,835

Note:

1. Walk and bicycle person trips will be internal to Treasure Island
2. Vehicle-trips includes passenger vehicles and vans
3. The marina use has already been approved and is not part of the proposed project (although the landside services associated with the Marina are included). The trip generation associated with the Marina is presented for informational purposes because it will be used to assess cumulative conditions.)

Source: *Treasure Island Transportation Plan*, Treasure Island Community Development, LLC, September 2006 and Fehr & Peers 2008

<sup>2</sup> A letter report to Bill Wycko, San Francisco Planning department "Proposed Trip Generation, Distribution, and Mode Split Forecasts for Treasure Island Transportation Impact Study", Fehr and Peers, December 8, 2008



### 3.2 Future Traffic Volumes on the Bay Bridge

Future traffic volumes for the Bay Bridge mainline were estimated using the MTC's travel forecasting model (BAYCAST 2009 RTP) for the AM peak hour and using the SFCTA's travel forecasting model (Champ 3.2) for the PM peak hour. The decision on using the model results from two different models is presented below.

- The MTC model was only validated for the AM peak period, not the PM peak period. Its AM peak hour data appears to be reasonably validated against the PeMS data plus observed unserved demand in both eastbound and westbound direction during the AM peak hour.
- The SFCTA model was validated for the PM peak period. Its PM peak hour data appears to be reasonably validated against the PeMS data plus observed unserved demand in both eastbound and westbound direction during the PM peak hour.

Table 3 presents a comparison of the two model results for the base year (2006) and 85 percentile traffic volume data obtained from PeMS data for 2006. It should be noted that SFCTA model's base year is 2005, so the 2006 SFCTA model demand is estimated based on an interpolation of the model output data between 2005 and 2030.

**Table 3 - Comparison of the MTC and SFCTA model results and PeMs data (2006)**

	<b>MTC Model</b>	<b>SFCTA Model</b>	<b>PeMs Data (85 percentile)</b>
<b>AM Peak Hour</b>			
Eastbound	8,541	9,399	8,012
Westbound	12,375	11,364	9,571
<b>PM Peak Hour</b>			
Eastbound	13,703	10,402	9,777
Westbound	8,771	9,399	8,493

Both the MTC model and the SFCTA model use ABAG's Projection 2007 data as the basis for the forecasts. The future year for the MTC model is 2035 and for the SFCTA model is 2030. Since the future year of SFCTA model is 2030, 2035 SFCTA model demand is estimated based on a straight line extrapolation of the model output data between 2005 and 2030.

In order to estimate I-80 mainline future traffic demand, the vehicle trips in the MTC and SFCTA model's trip table for Treasure Island and Yerba Buena were replaced with the vehicle trips presented in Table 1 and then the updated trip table was re-assigned to the roadway network.

Figure 2 (baseline transit) presents the forecasted future traffic demand as well as estimated volumes for the Bay Bridge mainline and Yerba Buena Island ramps. Because the metering lights limit the number of vehicles in the westbound direction to no more than 9,600 vehicles per hour, the actual vehicular volumes on the Bay Bridge after the metering lights are reduced to 9,600 vehicles. Likewise, the actual vehicular volumes on the Bay Bridge in the eastbound



direction are reduced to 9,750 in the eastbound direction. The constrained volumes are marked by “\*” in Figure 2 and these volumes will be used for the traffic operations analysis.

Table 4 presents a comparison of existing and future traffic demand and growth factors as well as constrained volumes and growth factors. It shows that traffic demand in the eastbound direction would grow by 2.5% in AM peak hour and 8.2% in PM peak hour and westbound direction would grow by 29.5% in AM peak hour and 15.1% in PM peak hour.

**Table 4 – Approach Traffic Volumes and Future Growth Factors**

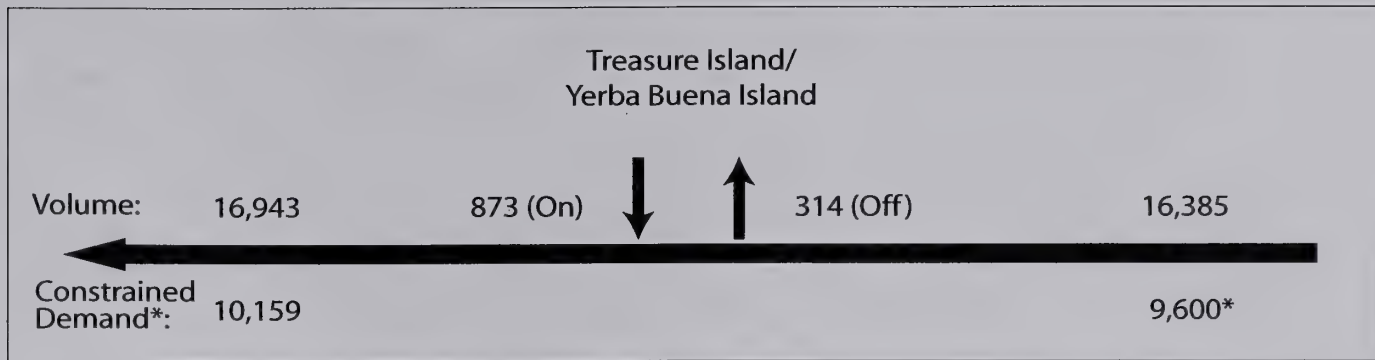
	Existing (2008)	Future with Baseline Transit	
		Total Volumes (2035)	Future Demand (2035)
Eastbound (SF approach)			
AM Demand	8,557		8,769
AM Volumes	7,273	8,769	
PM Demand	10,402		12,002
PM Volumes	9,011	9,750	
Westbound (East Bay approach)			
AM Demand	12,652		16,385
AM Volumes	8,740	9,600	
PM Demand	9,087		10,462
PM Volumes	7,340	9,600	

Note:

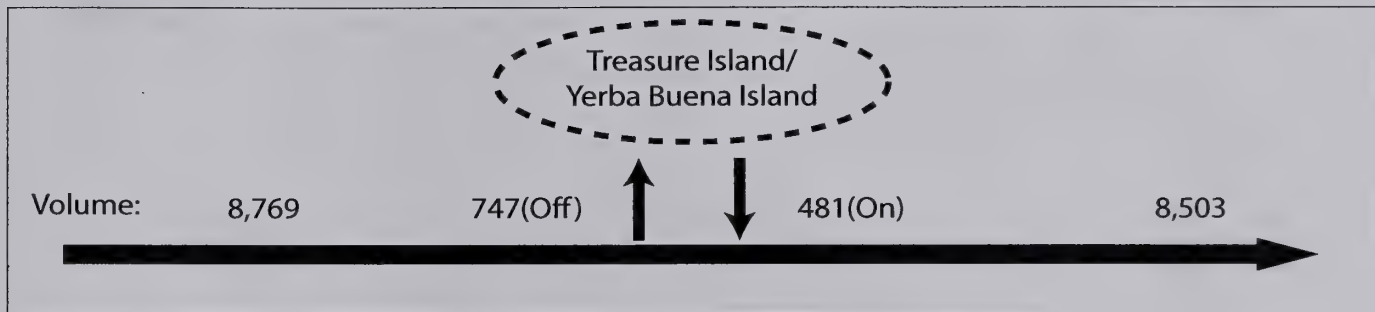
1. AM peak hour demands were based on the MTC model and PM peak hour demands were based on the SFCTA's model.
2. 2008 volumes are 85 percentile volumes obtained from the PeMS database.

## AM PEAK HOUR

Westbound

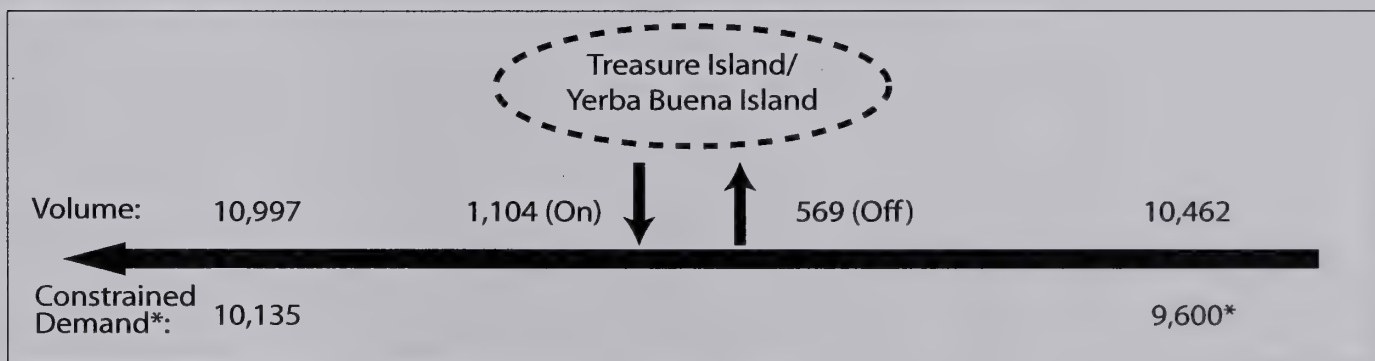


Eastbound

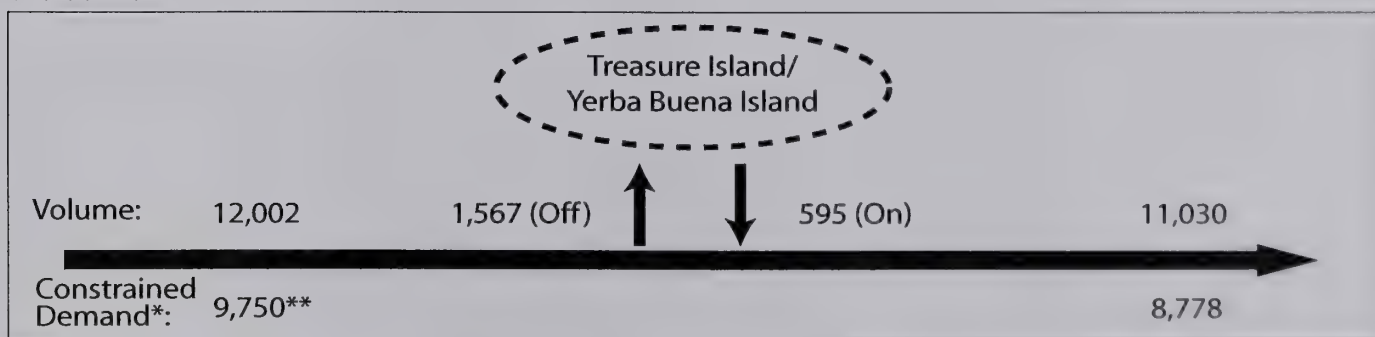


## PM PEAK HOUR

Westbound



Eastbound



\* Bay Bridge westbound traffic volumes are controlled by metering lights during both the AM and PM peak periods, and Caltrans sets a limit of 9,600 vehicles per hour onto the Bay Bridge.

\*\* Bay Bridge eastbound capacity is constrained by the ramps and mainline configuration near 1st Street. The highest volume counted between 2005 and 2007 was approximately 9,750 vehicles per hour.



**CHS** Consulting  
Group

Figure 2  
Future Bay Bridge and Ramp Traffic Volume  
Base Transit Scenario



## Appendix

## Appendix A - Proposed 4-D Adjustments to Trip Generation Rates Treasure Island Transportation Impact Analysis

December 8, 2008

Mr. Bill Wycko  
San Francisco Planning Department  
1650 Mission Street, 4<sup>th</sup> Floor  
San Francisco, CA 94103

**Re:     *Proposed Trip Generation, Distribution, and Mode Split Forecasts for  
Treasure Island Transportation Impact Study***

Dear Bill:

This letter report presents the trip generation, trip distribution, and mode split forecasts that we propose to use for the Treasure Island Transportation Impact Study. The proposed trip generation forecasts were developed using methods developed by Fehr & Peers and others (known as the 4D's method) to estimate trip generation as a function of design variables, such as:

- Density
- Diversity of uses
- Design of the street network to accommodate pedestrian and bicycle travel
- Distance to robust transit service

A brief description of the proposed project and the resulting traffic generation forecasts follows.

#### **TREASURE ISLAND DEVELOPMENT**

The Treasure Island Development Authority (TIDA) is proposing a redevelopment plan for Treasure Island and Yerba Buena Island that would include redeveloping most existing development on the islands, which primarily consists of low-density residential and light industrial development, into a new mixed-use development that includes housing, retail/commercial, recreational open space, and community facilities.

Specifically, the proposed project would remove about 1,000 dwelling units (of which approximately 800 are available for occupancy) and about 100 non-residential buildings, some of which are currently occupied. The proposed project would replace these uses with the following:

- Up to 6,000 new dwelling units, broken down as follows:
  - 1,454 townhomes/condominium flats
  - 495 rental flats
  - 1,058 affordable units (including rental, for sale, and supportive housing)
  - 2,876 high- and mid-rise units
  - 117-room condominium hotel
- 270,000 square feet of retail uses, including neighborhood-serving, lifestyle, and entertainment



- 325,000 square feet of “flex space,” including new construction and adaptive reuse of office, PDR/industrial, and museum space.
- 135,000 square feet of institutional uses, including an elementary school, police/fire services, community facilities, and a sailing center.
- 500 hotel rooms, including a 50-room wellness spa, 70 timeshare units, and approximately 300-380 room full-service hotel
- 300 acres of public recreational open space
- Expansion of the existing 100-berth marina near Clipper Cove to provide up to 400 berths<sup>1</sup>

## TRIP GENERATION

The methods commonly used for forecasting trip generation of projects in San Francisco are based on person-trip generation rates, trip distribution information, and mode split data described in the *SF Guidelines*. These data are based on a number of detailed travel behavior surveys conducted within San Francisco. The data in the *SF Guidelines* are generally accepted as more appropriate for use in the complex environs of San Francisco than more conventional methods because of the relatively unique mix of uses, density, availability of transit, and cost of parking commonly found in San Francisco. However, the methods described in the *SF Guidelines* cannot be directly applied at Treasure Island because of its unique location and because the proposed project is expected to fundamentally change the character of the island, limiting the usefulness of any information about existing uses at the island.

Similarly, standard vehicle-traffic generation rates, such as those provided by *Trip Generation*, 7<sup>th</sup> Edition, 2003, Institute of Transportation Engineers (ITE), would not be suitable for Treasure Island, unless appropriate adjustments were made to account for the project size, mix, and availability of transit. This trip generation report describes an exercise conducted by Fehr & Peers to estimate traffic generation of the proposed project using state-of-the-practice methods for adjusting standard traffic generation rates. This method was originally developed by Fehr & Peers and others for the US Environmental Protection Agency (EPA) and has been endorsed for use in project-specific and planning-level analyses by a number of jurisdictions, including the California Department of Transportation (Caltrans). This method is commonly referred to as the “4D” method, and generally accounts for the following factors that may influence traffic generation:

- **Density of the project** – the higher the proposed project’s density, the less vehicular traffic generated per unit of development
- **Diversity of uses** – an appropriate mix of uses can lead to internalization of trips within a project

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<sup>1</sup> Construction of the additional marina berths has already been approved, and they are not technically part of the proposed project. Landside services for the marina are part of this project. This trip generation report describes expected trip generation associated with the marina berths for informational purposes because the additional traffic associated with that already-approved project will be included in the cumulative analysis.

- **Design of project** – a walkable, pedestrian- and bicycle-oriented circulation system can help to reduce automobile dependence within a project site
- **Distance to transit** – locating uses near major transit facilities (typically within ½ mile), has been shown to increase transit use associated with trips to and from a project

A detailed description of how these factors can be used to adjust standard traffic generation rates was provided in a separate letter. That letter is attached as an appendix to this trip generation letter report. However, the general concept behind the 4D method is that projects that deviate from the base case (in this case, ITE methods) with respect to the four bulleted variables above exhibit different traffic generation patterns. Elasticities have been derived from travel behavior surveys to help estimate how traffic generation changes as a function of changes in the 4D's.

### ***Internal Trips***

The first step in the 4D method is to define the base case. In this case, the ITE trip generation methodology was selected as the base case, as it represents typical suburban, automobile-oriented development. The estimated project traffic generation using ITE methods is shown below in Tables 1 and 2 for the AM and PM peak hours, respectively.

The travel behavior surveys conducted by the City of San Francisco (summarized in the *SF Guidelines*) found that certain land uses, particularly retail uses, generate more person-trips than typical suburban developments. Specifically, assuming an automobile occupancy of 1.8 for retail trips, as documented in the 1995 *National Personal Transportation Survey*, the vehicle trip generation predicted by ITE for the project's retail uses can be converted to person trips. The number of peak hour person trips per unit of development, as summarized in the *SF Guidelines* for retail uses, is 70 percent higher than the ITE person trip prediction (again, when converting automobile trips to person-trips using a factor of 1.8).

There are a number of reasons why uses in a denser, more walkable area such as San Francisco might generate higher activity levels. However, as a conservative measure, for the base analysis, the retail vehicle trips predicted by ITE and shown in Tables 1 and 2 were adjusted upwards by 70 percent.

Once the base case is defined, the next step in the 4D process is to define the application area (i.e., the catchment area for trip internalization). For purposes of this analysis, we assumed the Treasure Island development would be contained within a single catchment area. This means that trips from anywhere within the development to anywhere else in the development could be internalized and that all uses are within reasonable walking or cycling distances from each other.

**Table 1**  
**Treasure Island Trip Generation Estimates (ITE Methodology<sup>1</sup>)**  
**AM Peak Hour - Base Case**

Land Use	Size	Units	ITE Land Use Code	Rate or Eqn.	AM Trip Generation		
					AM Trips	In	Out
Retail <sup>1</sup>							
Neighborhood Serving	115.0	ksf					
Shopping Center	87.0	ksf	820	Eqn	246	150	96
Grocery Store	28.0	ksf	850	Rate	156	95	61
Lifestyle + Entertainment	155.0	ksf					
Restaurant	54.0	ksf	932	Rate	529	275	254
Shopping Center	101.0	ksf	820	Eqn	269	164	105
Commercial/Flex/Adaptive Reuse							
Buildings 1, 2, and 3	325.0	ksf					
General Office	85.0	ksf	710	Eqn	165	145	20
Manufacturing	80.0	ksf	140	Rate	59	45	14
Multiplex Movie Theater	160.0	ksf	445	n/a	0	0	0
Residential							
All	6,000	Units					
Townhomes + Stacked Flats	1,454	Units	230	Rate	641	109	532
Rental Stacked Flats + TIDA/TIHD1	1,553	Units	220	Rate	793	159	634
Affordable Units	1,553	Units	220	Rate	793	159	634
High-Rise Units (10+ Stories)	2,876	Units	222	Rate	864	216	648
Condo Hotel	117	Units	311	Rate	46	25	21
Hotel							
3 Hotel Facilities	500	Rooms					
Wellness Spa	50	Rooms	331	Rate	17	12	5
Timeshare	70	Rooms	310	Eqn	86	52	34
Full-Service Hotel	380	Rooms	310	Eqn	470	287	183
Institutional							
Miscellaneous Institutional Uses	135.0	Ksf					
Elementary School	105.0	Ksf	520	Rate	493	266	227
Police/Fire Station	30.0	ksf	730	Rate	178	149	29
Recreational Community Center	13.5	Ksf	495	Rate	23	14	9
Sailing Center/Marina	15.0	Ksf	420	Rate	24	8	16
Recreational Open Space	300	Acres		Rate	82	65	17
Grand Total					5,141	2,236	2,905

**Notes:**

1. Vehicle trip generation for retail uses increased by 70 percent from ITE methodology based on evidence that retail uses in San Francisco generate approximately 70 percent more person-trips than typical suburban uses. This is a conservative assumption because a higher portion of the additional person trips generated by San Francisco retail uses are likely walk trips due to land use proximity.

Source: Fehr & Peers, September 2008



**Table 2**  
**Treasure Island Trip Generation Estimates (ITE Methodology<sup>1</sup>)**  
**PM Peak Hour - Base Case**

Land Use	Size	Units	ITE Land Use Code	Rate or Eqn.	PM Trip Generation			
					PM Trips	In	Out	
Retail <sup>1</sup>								
Neighborhood Serving	115.0	ksf						
	Shopping Center	87.0	ksf	820	Eqn	971	466	505
	Grocery Store	28.0	ksf	850	Eqn	581	296	285
Lifestyle + Entertainment	155.0	ksf						
	Restaurant	54.0	ksf	932	Rate	1,003	612	391
	Shopping Center	101.0	ksf	820	Eqn	1,073	515	558
Commercial/Flex/Adaptive Reuse								
Buildings 1, 2, and 3	325.0	ksf						
	General Office	85.0	ksf	710	Eqn	175	30	145
	Manufacturing	80.0	ksf	140	Rate	60	22	38
	Multiplex Movie Theater	160.0	ksf	445	Eqn	1,056	676	380
Residential								
All	6,000	Units						
	Townhomes + Stacked Flats	1,454	Units	230	Rate	757	507	250
	Rental Stacked Flats + TIDA/TIHD							
	Affordable Units	1,553	Units	220	Rate	964	626	338
	High-Rise Units (10+ Stories)	2,876	Units	222	Rate	1,008	615	393
Condo Hotel	117	Units	311	Rate	48	22	26	
Hotel								
3 Hotel Facilities	500	Rooms						
	Wellness Spa	50	Rooms	331	Rate	22	10	12
	Timeshare	70	Rooms	310	Rate	42	22	20
	Full-Service Hotel	380	Rooms	310	Rate	225	119	106
Institutional								
Miscellaneous Institutional Uses	135.0	Ksf						
	Elementary School	105.0	Ksf	520	Rate	330	142	188
	Police/Fire Station	30.0	ksf	730	Rate	38	12	26
	Recreational Community Center	13.5	Ksf	495	Rate	23	7	16
	Sailing Center/Marina	15.0	Ksf	420	Rate	55	33	22
	Recreational Open Space	300	Acres		Rate	160	66	94
Grand Total					8,591	4,798	3,793	

**Notes:**

1. Vehicle trip generation for retail uses increased by 70 percent from ITE methodology based on evidence that retail uses in San Francisco generate approximately 70 percent more person-trips than typical suburban uses. This is a conservative assumption because a higher portion of the additional person trips generated by San Francisco retail uses are likely walk trips due to land use proximity.

Source: Fehr & Peers, September 2008



The third step in the 4D process is to determine the characteristics of the proposed project, as they relate to the 4D variables described above. This process was done by comparing the project with typical suburban development patterns. The proposed project's percentage differences from typical developments were applied against elasticities developed from travel behavior surveys conducted by the Contra Costa Transportation Authority (CCTA). The resulting output from the 4D analysis tool is provided in the Appendix. Generally, the 4D analysis found that approximately 44 percent of all AM peak hour trips and 46 percent of all PM peak hour trips would be internal to the island. However, some post-processing adjustments were made to ensure a worst-case scenario.

#### Sensitivity to Jobs/Housing Mix

As noted at the beginning of this letter, one of the factors affecting traffic generation in the 4D method is the diversity of uses. A mix of uses within a single development can reduce vehicle traffic generation in a number of ways, such as accommodating shopping trips, dining out, and allowing walking or cycling to work within a mixed-use development. However, there is some question as to whether the residents expected to live at Treasure Island would be a good match for the jobs expected, which are likely to be primarily retail and service jobs.

To determine the effect that the jobs-housing mix has on the final internalization rate predicted by the 4D method, a sensitivity test was conducted. Reducing the elasticity for home-based work trips associated with the jobs/household mix to zero results in a reduction in overall trip internalization in both the AM and PM peak hour analyses of seven percentage points. (The 4D spreadsheet analyses with a 50 and 100 percent reduction in the elasticities for jobs/household diversity for home-based work trips are included in the Appendix.)

To ensure that the project's traffic impact analysis is performed for a worst-case scenario, we recommend the trip generation analysis be based on the scenario in which the jobs/housing mix has no effect on home-based work trips (i.e., we will assume that nobody who lives on the island also works on the island). Therefore, the final trip internalization percentages we propose to use are:

- 37% of AM peak hour trips will be internal to the island
- 40% of PM peak hour trips will be internal to the island

Those percentages were applied to the vehicle trip generation estimates from ITE, described in Tables 1 and 2, and represent primarily walk and bicycle trips on Treasure Island. The remaining trips represent transit and auto trips onto and off of the island.

#### Comparison to Other High-Density, Mixed-Use Developments

The conclusion that between 37 and 40 percent of all peak hour person-trips made on Treasure Island would be internal to the island is relatively high compared to typical reductions taken to account for trip internalization. Therefore, in order to determine if this reduction is reasonable, a comparison was made to other high-density, mixed-use development projects around the United States. This comparison is summarized in Table 3.

**Table 3**  
**Predicted vs. Observed Internalization at Other Mixed-use Sites**

Site	Project Description	Internal % Count	Internal % 4D Estimate	Error
<b>S Davis<sup>1</sup></b>	791 Acre Site: <ul style="list-style-type: none"> <li>• 550 ksf Office</li> <li>• 559 ksf Retail</li> <li>• 0 Hotel Rooms</li> <li>• 4,402 Residential Units</li> </ul>	45%	50%	5%
<b>Moraga<sup>1</sup></b>	6,109 Acre Site: <ul style="list-style-type: none"> <li>• 1,720 ksf Office</li> <li>• 180 ksf Retail</li> <li>• 0 Hotel Rooms</li> <li>• 6,000 Residential Units</li> </ul>	47%	36%	-11%
<b>Galleria<sup>1</sup></b>	165 Acre Site: <ul style="list-style-type: none"> <li>• 137 ksf Office</li> <li>• 1,150 ksf Retail</li> <li>• 229 Hotel Rooms</li> <li>• 722 Residential Units</li> </ul>	38%	17%	-21%
<b>Village Commons<sup>2</sup></b>	72 Acre Site: <ul style="list-style-type: none"> <li>• 293 ksf Office</li> <li>• 231 ksf Retail</li> <li>• 0 Hotel Rooms</li> <li>• 317 Residential Units</li> </ul>	28%	46%	18%
<b>Crocker<sup>2</sup></b>	26 Acre Site: <ul style="list-style-type: none"> <li>• 209 ksf Office</li> <li>• 87 ksf Retail</li> <li>• 256 Hotel Rooms</li> <li>• 0 Residential Units</li> </ul>	41%	18%	-23%
<b>Mizner<sup>2</sup></b>	30 Acre Site: <ul style="list-style-type: none"> <li>• 88 ksf Office</li> <li>• 163 ksf Retail</li> <li>• 0 Hotel Rooms</li> <li>• 136 Residential Units</li> </ul>	40%	43%	3%
<b>Boca del Mar<sup>2</sup></b>	253 Acre Site: <ul style="list-style-type: none"> <li>• 303 ksf Office</li> <li>• 198 ksf Retail</li> <li>• 0 Hotel Rooms</li> <li>• 1,144 Residential Units</li> </ul>	33%	38%	5%
<b>Country Isles<sup>2</sup></b>	61 Acre Site: <ul style="list-style-type: none"> <li>• 59 ksf Office</li> <li>• 193 ksf Retail</li> <li>• 0 Hotel Rooms</li> <li>• 368 Residential Units</li> </ul>	33%	42%	9%

**Notes:**

1. Cordon counts conducted by Fehr & Peers
2. From mixed-use trip generation estimation methodology, *ITE Handbook*, Appendix C  
Fehr & Peers, October 2008

As shown in Table 3, there are a number of sites with similar land use mixtures and densities where trip internalization rates between 35 and 45 percent have been observed. In addition, at the sample sites, application of the 4D method improved the accuracy of trip generation forecasting, with standard errors of +/- 25 percent, compared to typical standard errors of +/- 90 to +/- 140 percent for office and residential land uses, respectively, when estimated directly from the ITE *Trip Generation* manual.

In light of the above, the conclusion that approximately 37 to 40 percent of Treasure Island trips would be internal to the island appears reasonable.

### **Mode Split (Transit Usage)**

Transit usage associated with development on Treasure Island is estimated based on data presented in *Characteristics of Rail and Ferry Station Area Residents in the San Francisco Bay Area: Evidence from the 2000 Bay Area Travel Survey*, Metropolitan Transportation Commission (MTC), September 2006, (BATS Study). That report describes a number of characteristics, including residential proximity to transit service, that influence transit ridership in the Bay Area.

According to the BATS Study, 34 percent of work trips and 17 percent of all non-work trips made by San Francisco residents living within ½ mile of a rail or ferry terminal are via transit<sup>2</sup>. Further, the study notes that of work-related transit trips made by San Francisco residents living within ½ mile of a rail or ferry terminal, approximately 50 percent are made by ferry/rail and the remaining 50 percent are made by bus. Non-work trips are more likely to be made by bus, with 65 percent of transit trips made by bus and 35 percent made by rail/ferry. The transit mode shares for work and non-work trips from the BATS Study were applied to the proposed Treasure Island development to estimate bus and ferry ridership.

Given the disincentives to driving and incentives for transit use proposed by the project, it is reasonable to expect the proposed project to have a slightly higher transit mode share than the average San Francisco development. However, to be conservative, and because data on the effectiveness of such disincentives is limited, the Treasure Island project was treated as a typical San Francisco project (i.e., no additional transit ridership was assumed associated with the disincentives to driving).

Based on the portion of work vs. non-work trips associated with each land use described in the *Transfer and Reuse of Naval Station Treasure Island Final EIR* (Appendix E, San Francisco Planning Department, June 2006, State Clearinghouse #1996092073), the transit mode share for each land use was forecast. These transit mode share percentages were applied to the ITE trip generation forecasts described in Tables 1 and 2, with the appropriate conversion to person-trips. A more detailed calculation of external vehicle traffic generation using the ITE methodology, with 4D adjustments and transit ridership calculations is provided in Table A-1 in the Appendix.

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<sup>2</sup> These observed percentages are of all trips, including walk and bicycle trips which are analogous to the internal trips described earlier for Treasure Island. Thus, although the transit mode shares taken as a percentage of only external trips are higher than 34 and 17 percent for work and non-work trips, respectively, application of these percentages to all trips generated by the Treasure Island project is consistent with the findings of the BATS Study. If taken as a percentage of external trips only, transit is expected to represent approximately 37 percent of all person-trips generated by the proposed project.



The resulting person-trip generation for all modes is summarized in Table 4, below.

Table 4 Final Adjusted Trip Generation by Mode					
Land Use	Person-Trips <sup>1</sup>				Vehicle-Trips <sup>2</sup>
	Ferry	Bus	Auto	Internal	
Weekday AM Peak Hour					
Residential	431	526	1,405	1,387	878
Hotel	100	126	352	339	220
Retail	131	222	858	712	536
Open Space	9	15	59	48	37
Marina <sup>3</sup>	6	8	34	29	21
Flex	41	50	134	133	84
Police/Fire	33	40	107	106	67
School	91	111	296	291	185
Total	840	1,098	3,245	3,045	2,028
Weekday PM Peak Hour					
Residential	510	623	1,534	1,778	959
Hotel	50	63	165	186	103
Retail	397	669	2,418	2,320	1,511
Open Space	17	29	107	102	67
Marina <sup>3</sup>	9	14	53	50	33
Flex	237	289	712	826	445
Police/Fire	7	9	21	24	13
School	90	90	138	211	86
Total	1,316	1,787	5,144	5,496	3,215
1. Walk and bicycle person trips will be internal to Treasure Island					
2. Vehicle-trips includes passenger vehicles and vans					
3. The marina use has already been approved and is not part of the proposed project (although the landside services associated with the Marina are included). The trip generation associated with the Marina is presented for informational purposes because it will be used to assess cumulative conditions.					
Source: <i>Treasure Island Transportation Plan</i> , Treasure Island Community Development, LLC, September 2006 and Fehr & Peers 2008					

#### Base Transit Case

As proposed, the Treasure Island project would provide a high level of transit service during peak hours, including:

- New ferry service to San Francisco every 10 minutes
- New bus service to Downtown Oakland every 7 minutes
- Maintenance of the existing bus service to the Transbay Terminal (Muni Route 108-Treasure Island) in San Francisco every 5 minutes
- New bus service to the San Francisco Civic Center area every 12 minutes

Assuming a bus capacity of 55 passengers and a ferry capacity of 450 passengers, the total transit capacity in a single direction (on or off of the island) is 4,075 passengers per hour, including 2,700 passengers on ferries and 1,375 passengers on buses during the peak hours.

However, funding and/or operating details for all of this service has not yet been resolved. Therefore, the transportation analysis is also including a scenario in which ferry service would be provided every 50 minutes (corresponding to a single ferry operating at one of the existing docks in San Francisco), Route 108-Treasure Island would operate at its current 15-minute headway, and no new transit route between Treasure Island and San Francisco Civic Center would be provided. AC Transit service to the East Bay would be the same as in the base case. This would reduce the overall transit capacity to 1,200 person trips per hour, a reduction of 70 percent. Specifically, this would reduce ferry capacity by 80 percent, to 540 passengers per hour and bus capacity by 52 percent, to 660 passengers per hour.

Recent studies summarized by the Victoria Transport Policy Institute (VTPI) have shown a range of transit ridership elasticities with respect to service level of between 0.5 and 0.7<sup>3</sup>. Using the 0.5 elasticity, an 80 percent reduction in the supply of ferry transit and a 52 percent reduction to the supply of bus transit provided to Treasure Island is expected to yield 40 and 26 percent reductions to ferry and bus ridership, respectively. Therefore, for the base case, the ferry ridership is reduced by 40 percent and the bus ridership is reduced by 26 percent compared to the full project case, with the difference assumed to switch to automobile person trips.

Table A-2 in the Appendix provides a detailed calculation of vehicular traffic generation for the base transit case. The net result is an additional 388 AM peak hour vehicle trips and 620 PM peak hour trips.

### TRIP DISTRIBUTION

The final component of this analysis is an estimation of the trip distribution of project-generated trips. The proposed project trip distribution was tested using two different travel demand forecasting models, the San Francisco CHAMP model, maintained by the San Francisco County Transportation Authority, and the Alameda County Congestion Management Agency (ACCMA) model. Table 5 provides a summary of geographic distribution of project traffic from the two travel demand forecasting models.

As shown in Table 5, the SF CHAMP model, which has a concentration of detail within San Francisco, tends to predict a higher amount of Treasure Island traffic would be destined for San Francisco than the ACCMA model. Similarly, the ACCMA, which has a higher amount of detail in the East Bay, tends to predict a higher amount of traffic with origins and destinations in the East Bay. Because having a higher amount of detail in a particular geographic region of a model can lead to over-prediction of traffic in that area, it is likely that the SF CHAMP and the ACCMA models each over-predict traffic within their specific focal regions. Table 5, therefore, presents an average of the trip distributions predicted by the two models. The average trip distribution between the SF CHAMP and ACCMA models corrects for over-prediction of trips to either San Francisco or the East Bay.

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<sup>3</sup> <http://www.vtpi.org/tranelas.pdf>



**Table 5**  
**Treasure Island Development – Trip Distribution Patterns**

Source	Place of Trip Origin/Destination				
	San Francisco	East Bay	North Bay	South Bay	Internal
SF CHAMP Model	42%	4%	4%	8%	41%
ACCMA Model	32%	21%	4%	2%	40%
<b>Average of Forecasting Models</b>	<b>37%</b>	<b>13%</b>	<b>4%</b>	<b>5%</b>	<b>41%</b>

Source: Fehr & Peers, September 2008

## CONCLUSION

The vehicle trip generation forecasts developed using the 4D method are reasonable, and similar to other large, high-density, mixed use sites observed by Fehr & Peers and ITE. We therefore recommend using the person-trip generation summarized in Table 4 for identifying impacts associated with the Treasure Island development.

Prior to completing that analysis, we will provide you with draft cumulative conditions traffic forecasts for area freeways and an analysis of the effects of congestion pricing. We can complete the first draft of the Treasure Island Transportation Impact Analysis following your approval of the traffic forecasts and congestion pricing and the recommendations in this memo. We hope you have found the results of this trip generation study useful. We look forward to receiving your comments. Please feel free to call if you have any questions.

Sincerely,  
FEHR & PEERS



Chris Mitchell, PE  
Associate

SF07-0340

## APPENDIX



August 4, 2008

Ms. Pat Siefers  
San Francisco Planning Department  
1650 Mission Street, 4<sup>th</sup> Floor  
San Francisco, California 94103

**Re:     *Proposed "4-D Adjustments" to Trip Generation Rates***  
***Treasure Island Transportation Impact Analysis (Revised)***

Dear Pat:

The proposed development on Treasure Island will consist of a number of design features that will have a substantial influence on travel characteristics at the site, compared to more typical developments. This letter describes our proposed approach to quantifying the effects that these design features will have on the trip-making characteristics of the project. This approach has been developed and utilized by Fehr & Peers for several projects throughout the United States, and has been endorsed by the Environmental Protection Agency (EPA) (see attached document: *INDEX 4D Method*, October 2001), the California Department of Transportation (Caltrans), and others, as being an appropriate method for developing traffic forecasts that are sensitive to the types of local land use characteristics and TDM measures proposed by the Treasure Island project.

The unique nature of this site, in terms of its design, the transportation features it will offer, and its setting in the midst of San Francisco Bay, renders traditional methods of estimating vehicle traffic generation ineffective. Specific reasons traditional methods, which are based on national or even locally-derived average rates, may not be relevant to Treasure Island are as follows:

- The island location and congestion on the Bay Bridge will limit vehicular connectivity to off-island sites, thus encouraging on-island travel when possible; proposed congestion pricing will further reduce off-island vehicle trips (although the effects of congestion pricing will be addressed separately)
- Mixed land uses in close proximity will encourage on-island internalization of many trips
- High frequency transit service, both bus and ferry, will reduce auto trips during commute periods; additionally, transit-oriented residents are likely to self-select this transit-oriented development
- Substantial travel demand management (TDM) measures are proposed to reduce vehicle travel and vehicle ownership, including:
  - Bus and ferry service to San Francisco and bus service to Downtown Oakland<sup>1</sup>
  - Signal-controlled metering of traffic volumes onto Bay Bridge
  - Car share
  - Bicycle share
  - On-island shuttle
  - Guaranteed ride home
  - Commuter checks
  - On-island travel coordinator
  - Unbundled parking (sold/rented separately from commercial and residential sites)

<sup>1</sup> If additional AC Transit service is recommended as a mitigation, we will include this in the analysis.

- Priced parking
- On-street residential permit parking
- Transit passes included in HOA dues/leases

These site and travel characteristics are essential elements of a walkable, livable community, but are often disregarded in environmental review. Outside of San Francisco, conventional practice conservatively analyzes the trip generation potential for new development in isolation, and under the assumption that such development is a typical suburban and generally auto-oriented project. In San Francisco, these elements are captured by using locally-calibrated person-trip generation rates and mode split percentages derived from surveys and observations. However, the extent and combination of high density development; a pedestrian, transit, and bicycle-oriented circulation network; mixing of uses; and the proximity of the project site and proposed transit service to major destinations; and the isolated nature of this project are unlike other parts of San Francisco. As a result, locally-derived information from other parts of San Francisco may still not predict the traffic-generating characteristics of the proposed project.

To more accurately model the travel characteristics of a proposed development, Fehr & Peers has developed a methodology for adjusting trip generation based on the unique characteristics of a project site. Adjustments for external vehicle trip length (and thus Vehicle Miles Traveled (VMT)) are also typically considered in the Fehr & Peers approach, as ultimately it is VMT rather than VT (vehicle trips) that congests roadways, produces greenhouse gases, uses non-renewable fossil fuels, etc. We will work with Turnstone Consulting and ESA to determine whether the VMT adjustment is a useful component for their studies.

We will provide a qualitative discussion of the differences between this method and the ITE and San Francisco guidelines for traffic analysis in our analysis memo. We will also review available and relevant data from comparable locations (such as Granville Island/ City of Vancouver) and consult with the MTC and SFCTA regarding reasonable mode splits and trip generation for travel to, from, and within Treasure Island.

The purpose of this memo is to summarize the theory and background for this methodology and outline the proposed adjustment steps and assumptions.

## **THEORY AND BACKGROUND**

The origin of this methodology lies in the research of UC Berkeley professor Robert Cervero.<sup>2</sup> This research found that certain characteristics of the neighborhood a household lived in affected the number of vehicle trips generated and vehicle-miles traveled by that household. This effect was independent of the household characteristics (income, household size, number of workers, etc.) typically used in trip generation equations. Where study areas vary significantly in character from the conventional trip generation site (typically a suburban, low-density site), trip generation should therefore include an adjustment of household-based trip-generation rates to reflect the characteristics of the area surrounding the household. The *ITE Trip Generation Manual*, among others, has been recommending such an adjustment for its last three editions. The *ITE Trip Generation Manual*, 7<sup>th</sup> Edition, provides some guidance on adjustments for trip internalization (or interaction between uses) at multi-use sites, but adjustments are based on a small number of studies in Florida that may not be applicable to an urban setting such as Treasure Island.

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<sup>2</sup> Cervero, R. and K. Kockelman (1997) "Travel Demand and the 3Ds: Density, Diversity, and Design," *Transportation Research D*, Vol. 2, pp. 199-219



To respond to a need for site-specific adjustment factors, Fehr & Peers developed a Smart Growth Trip Generation Adjustment tool to compare trip generation characteristics of a study location to the typical characteristics of the trip generation rate survey locations.

## NEIGHBORHOOD CHARACTERISTICS INCLUDED IN THE ADJUSTMENT

The choice of which neighborhood characteristics to adjust for is evolving over time and may vary from place to place. The methodology described in this memo includes adjustments for up to seven neighborhood characteristics. These characteristics, often referred to as the "Ds," are:

Net Residential and Employment Density – This variable is measured in units of dwelling units per acre for residential density and total jobs per acre for employment density. The acreage should include pocket parks and local streets, but exclude large parks, open space, lakes, etc. This matches the practice in general plans where areas designated for residential and commercial development typically show large non-residential and non-commercial features but typically do not include details of local streets and neighborhood amenities. Research suggests that, all else being equal, denser developments generate fewer vehicle-trips per dwelling unit and per job than less dense developments.

Jobs/Housing and JobMix Diversity – Research, including the previously-cited Cervero study and *INDEX 4D Method* (see attached), suggests that having residences and jobs in close proximity will reduce the vehicle-trips generated by each by allowing some trips to be made on foot or by bicycle. This variable measures how closely the neighborhood in question matches the "ideal" mix of jobs and households, which is assumed to be the ratio of jobs to households measured across the region as a whole. The equation for this is:

Jobs/Housing Diversity =

$$\{1 - [\text{ABS}(b * \text{households} - \text{employment}) / (b * \text{households} + \text{employment})]\}$$

where:  $b$  = regional employment / regional households

Research also suggests that having retail and non-retail jobs in close proximity will reduce the vehicle-trips generated by each by allowing some non-home-based trips, such as running errands or going to lunch, to be made on foot or by bicycle (see attached *INDEX 4D Method*). This variable measures how closely the neighborhood in question matches the "ideal" mix of retail and non-retail jobs, which is assumed to be the ratio of retail to non-retail jobs measured across the region as a whole. The equation for this is:

JobMix Diversity =

$$\{1 - [\text{ABS}(b * \text{retail jobs} - \text{non-retail jobs}) / (b * \text{retail jobs} + \text{non-retail jobs})]\}$$

where:  $b$  = regional retail jobs / regional non-retail jobs

Walkable Design – Many pedestrian and bicycle improvement projects are based on the assumption, supported by the attached research findings<sup>3</sup>, that improving the

<sup>3</sup> Note that research also shows that these improvements are only effective in areas where the land uses are conducive to walking and bicycling. Otherwise, these improvements will have less benefit.

walking/biking environment will result in more non-auto trips and a reduction in auto travel. The difficulty with using this variable in an equation is that there are many factors in the pedestrian experience and it is difficult to come up with a single definition that captures them all. The current equation used to measure the design variable is:

$$\text{Design} = 0.0195 * \text{street density} + 1.18 * \text{sidewalk completeness} + 3.63 * \text{route directness}$$

where: 0.0195, 1.18, and 3.63 are coefficients expressing the weighting of each variable relative to the other variables in the Design formula,

*street density* = length of street in miles/area of neighborhood in square miles

*sidewalk completeness* = percent of street frontage with sidewalks

*route directness* = airline distance/distance along street routes for typical trips

The coefficients weighting the design variables were derived from regression analysis based on data provided by the Sacramento Area Council of Governments (SACOG). Test applications of the methodology have found that the data required for the design variable is often either not available or would be expensive and time-consuming to obtain. In such cases it may be better for the user to develop their own design variable based on whatever relevant information is available, or even to simply assume a certain percentage difference from the base case (i.e. "The proposed community is designed to be significantly more ped-friendly than the older areas around it, and so we are assuming a 20% improvement in the design variable"). Users should be conservative when deviating from the original equations. In any case, the design variable usually has the weakest influence on the overall adjustment, so it is unlikely to be a major source of error.

*Distance from Transit (Residential):* The Bay Area Transportation Survey (BATS) in 2000 demonstrated that the distance from a person's place of residence to a transit station has a significant effect on the number of vehicle miles traveled per day and on transportation mode choice (e.g., whether to drive or take transit) for both work and total trips. Recent research by UC Berkeley Professor Robert Cervero suggests this is partially explained by a self selection process, wherein transit riders select to live in transit-oriented locations.

Conventional trip generation rates do not account for proximity to transit. Even San Francisco's uniquely observed mode split data is not sensitive to the proximity of a use to a major transit facility (i.e., BART, LRT, or Caltrain station). So, modification to trip generation and mode split information are necessary to reflect expected patterns at Treasure Island in a way that is sensitive to the amount and type of transit to be provided.

The BATS 2000 data suggests the following reductions are appropriate for home-based work trips and total daily trips (generalized for the Bay Area):

Within 1/2 mile of a rail station or ferry terminal:

- 29.4% for work trips
- 19.2% for all trips

Within 1/2 to 1 mile of a rail station or ferry terminal:

- 16.5% for work trips
- 8.4% for all trips



Greater than 1 mile, the transit deduction varies based on residential density. For high density suburbs (an analogous use to the Treasure Island development if it were greater than 1 mile from a major transit facility), the following reductions apply:

- 7.1% for work trips
- 3.3% for all trips

These data show that across the Bay Area, residential developments within ½ mile of a rail station or ferry terminal have a transit mode share 22.3% higher than those developments that are greater than 1 mile from a major transit facility for home-based work trips.

Distance from Transit (Employment): Jennifer Dill (2000) conducted a survey of over 1,000 large employment sites in the San Francisco Bay Area to establish similar links between vehicle trips and distance from employment locations to transit. The study considered distance from BART, Caltrain, and Santa Clara Light Rail Stations. Depending on the frequency and cost of transit service to/from Treasure Island, transit deductions for employment on the island may be analogous (i.e., the increase from the background case to the case where a job is within ½ mile of transit). The deductions are summarized in the following table. For employment land uses, these deductions are generally applied to AM and PM peak hour trips. For daily trips, they may be applied at approximately one-half. As shown in the table, employment locations within ½ mile of a rail station have a transit mode share 8.6% higher than those employment locations that are greater than ½ mile from a major transit facility (11.1% for employment locations within ½ mile of a rail station compared to 2.5% for those locations greater than ½ mile from a major transit facility).

The list of variables is expected to evolve over time. As the preceding list shows, the methodology has proceeded beyond Cervero's original three D's and may ultimately include as many as ten variables.

SUMMARY OF TRANSIT USE BY WORK SITE LOCATION			
Location of Work Site	Percent of Commute Trips by Transit (Trip Deductions)	Number of Work Sites Surveyed	Number of Respondents
<b>All sites</b>	4.4%	1,153	251,835
<b>BART Stations</b>			
Up to 1/4 mile from BART	33.6%	44	12,813
Up to 1/4 mile from non-downtown Oakland BART	19.7%	12	2,891
Up to 1/4 mile from non-Oakland or Berkeley BART	6.2%	3	468
1/4 -1/2 mile from BART	7.9%	22	3,852
1/4 -1/2 mile from non-Oakland or Berkeley BART	5.7%	13	2,151
<b>CalTrain Stations<sup>1</sup></b>			
Up to 1/4 mile from CalTrain	7.0%	14	3,134
1/4 -1/2 mile from CalTrain	4.1%	39	9,905
<b>Santa Clara Light Rail Stations</b>			
Up to 1/4 mile from Light Rail	5.9%	49	9,833
1/4 -1/2 mile from Light Rail	3.1%	56	16,633
<b>All Rail Stations</b>			
Up to 1/4 mile from rail	19.8%	107	25,780
1/4 -1/2 mile from rail	4.0%	117	30,390
Up to 1/2 mile from rail	11.1%	224	56,170
<b>Work Sites over 1/2 mile from rail</b>			
All sites	2.5%	929	195,665
<sup>1</sup> Note that Caltrain ridership is significantly affected by employer shuttles to transit			
Source: Dill, Jennifer. "Transit Use and Proximity to Rail: Results from Large Employment Sites in the San Francisco Bay Area." TRB 2003 Annual Meeting CD-ROM.			

## APPLICATION

The above adjustment factors will be applied to standard, traditional traffic generation estimates for purposes of forecasting traffic generation for the Treasure Island development. The steps we propose to take are described below.

### Step 1: Define the Base Case

The outputs this methodology produces are percentage adjustments to vehicle-trips (VT) and vehicle-miles-traveled (VMT). Obviously, this methodology presumes that there is some default estimate of VT and VMT to which the adjustments can be applied; i.e. a base case. For most applications the base case should be taken from the original source of the trip-generation rates used for the project. For the Treasure Island project, we will define two base cases, and apply the appropriate adjustments. One base case will be application of City person-trip generation



rates, and weighted average mode split percentages for uses over the entire City. Other characteristics evaluated (e.g., density, design, diversity, etc.) will be based on the proposed project's deviation from citywide averages. The second base case will be the application of standard vehicle-trip generation rates based on nationwide surveys in primarily suburban locations from the Institute of Transportation Engineers (ITE) *Trip Generation*, 7<sup>th</sup> Edition. The adjustment factors applied to these rates will be based on the proposed project's deviation from typical suburban characteristics.

### Step 2: Define the Application Area

The equations used in the methodology were derived from survey areas one-half mile in radius<sup>4</sup> which corresponds roughly to a typical walkshed. The user must therefore define the adjustment area to match this size. There are several possible cases (the Treasure Island project is similar to Case 3, but all cases are presented for informational purposes):

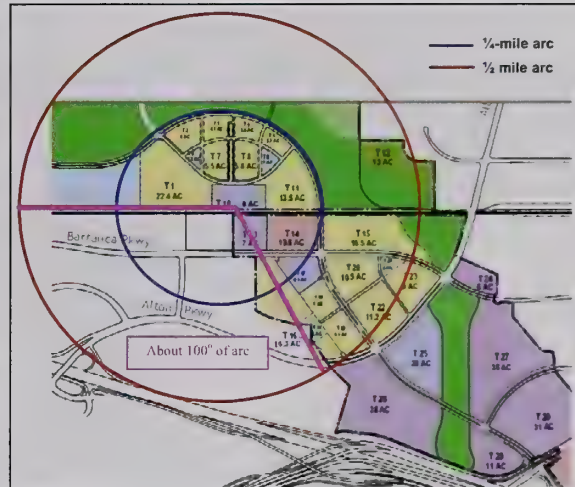
Case 1: The project is larger than the ½-mile radius. In such a case the user should define one or several non-overlapping areas and apply the methodology separately to each. In practice we have found that larger projects often include areas that are similar enough to the base case that no adjustment need be made.



Case 1: The site extends beyond the ½-mile radius used for analysis. Separate analyses should be done for different portions of the site. (Image created by Fehr & Peers for Heritage Fields Development, Irvine, CA)

<sup>4</sup> Other area sizes were checked, including ¼ mile radius, 1-mile radius, and TAZs, were found to be less statistically valid than the ½ mile radius.

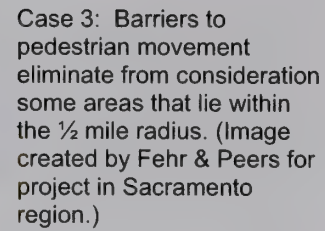
Case 2: The project is smaller than the ½-mile radius. In this case the area for adjustment will extend beyond the project into the surrounding area. The rationale is that future residents of the project make no distinctions between the project and other areas, and so such boundaries are irrelevant to the behavior we are trying to predict. In the figure shown below, the study site is shown in color while the ½-mile radius is shown in red. The white areas within the ½-mile radius southwest of the site are existing office buildings that would interact with the proposed residential development. In this case, application of this methodology will require obtaining estimates of the density, diversity, and design of the area beyond the boundaries of the study site but within the ½-mile radius.



Case 2: The ½-mile radius extends beyond the study site (Image created for Heritage Fields Development, Irvine, CA)

Case 3: The ½-mile radius includes significant barriers to pedestrian movement, such as rivers, freeways, and soundwalls. This is the case for Treasure Island, where walk trips to other uses outside of the Treasure Island development are precluded by the San Francisco Bay to the north, east, and west, and by steep inclines and the Bay Bridge to the south. In such a case the user should include in the analysis only the areas within ½ mile of the center along walkable paths. An example of this application can be seen in the figure below. The project included a dense, mixed-use village core area as well as a golf course, several lakes, and some low- and medium-density residential developments. The golf course and lakes act as barriers to pedestrian movement except across bridges. In this case the adjustment methodology was applied only to the area outlined in red in the figure, and the remaining portion of the project was treated as the conventional development it was. The adjustment area actually extended to the north outside the project but since this was an agricultural preserve it had no practical impact on the application.





Once the base case and the analysis area have been defined, the next step is to enter their data into the analysis tool. The tool then calculates the “Ds” characteristics for the two base cases (i.e., the San Francisco citywide averages and the national averages) and the test scenario (i.e., the proposed project) and computes the percentage difference between the proposed project and the two base cases. The analysis tool then applies the elasticities associated with the first three “D’s” (Density, Diversity, and Design) to develop initial estimates of reductions in VT associated with the site design characteristics. Ceiling and floor values can be applied to set a maximum allowable adjustment overall or for an individual “D.”

4-D VEHICLE TRIP ELASTICITY VALUES							
Trip Purpose	Net Residential Density	Net Employment Density	Job Mix Diversity	Jobs/Housing Diversity	Design	Home-based Work Destinations	Non-Home-based Work Destinations
Vehicle Trip (VT) Elasticities							
Home-based Work (HBW)	-0.117	N/A	N/A	-0.059	0.000	-0.375	N/A
Home-based Other (HBO)	-0.119	N/A	N/A	-0.044	-0.032	N/A	-0.408
Non-Home-based (NHB)	N/A	-0.339	-0.462	N/A	0.000	N/A	-0.822
Vehicle Miles Traveled (VMT) Elasticities							
Home-based Work (HBW)	-0.238	N/A	N/A	-0.260	0.000	-1.234	N/A
Home-based Other (HBO)	-0.133	N/A	N/A	-0.160	-0.030	N/A	-1.405
Non-Home-based (NHB)	N/A	-0.444	-0.459	N/A	0.000	N/A	-1.318
Source: Sacramento County Association of Governments (SACOG) Household Surveys							

#### Step 4: Internalization Results

The tool returns the following results:

- VT Internalization Reductions: Adjustments to trip generation rates if the rates are disaggregated by purpose; otherwise, an estimate for an overall trip generation reduction.
- VMT Internalization Reductions: VMT reduction estimates provide some indication of the overall reduction in the project's impact on regional traffic. While we are not proposing to re-run the SFCTA travel demand model, a better estimate of project-related VMT reductions could be made by applying the VT reductions to the trips generated by project traffic analysis zones (TAZs), then running the model and checking how much VMT changed, compared to the proposed project generating traffic at the citywide average.

#### Step 5: Additional External Trip Reductions

In this final step we will take additional reductions for pass-by trips, diverted link trips, transit proximity, and TDM strategies. Adjustments for the fourth "D" (Distance from transit), will be applied to the national average base case directly from the tables presented earlier. We will apply the "distance from transit" adjustment factor to the San Francisco-specific base case based on the difference between the transit mode share for developments within ½ mile of a major transit station to those that farther than ½ mile (both residential and commercial). The quality and



frequency of transit service will also be considered in the transit adjustment. Service characteristics will be applied using ridership elasticities based on planned transit frequency and type (multiple scenarios) versus the baseline frequency and type inherent in the distance from transit adjustments in the BATS data and Dill research.<sup>5</sup>

External SOV to HOV, bicycle, or pedestrian mode shifts will also be applied in this final step. The results of the MEA TransBay Area employee data analysis and other relevant sources will be considered to validate the mode split if available.

By following the five steps listed above and using elasticities derived from previous analyses, we can estimate how the proposed project would differ from both the average development in San Francisco (Base Case 1) and the average development in the United States (Base Case 2), in terms of vehicle-trips generated and increases to vehicle-miles traveled. The result will be percentage reductions to standard vehicle-trip generation rates in San Francisco and to ITE trip generation rates. The 4Ds analysis output will be a quantification of mode shifts to non-SOV transportation for both internal trips and external trips.

Both internal and external reductions to auto shares will be treated as additions to other modes, with trip volumes not disappearing but rather being added to multi-modal volumes.

The mix of housing proposed at Treasure Island is 80% market rate and 20% affordable, consistent with requirements for most new housing developments in San Francisco. To be conservative, we are not proposing any reductions to vehicle trip generation for the affordable portion of the housing.

The vehicle-trip generation rates derived using this approach will be compared to those derived by Korve/DMJM Harris in the Treasure Island Transportation Plan to determine if those rates are reasonable.<sup>6</sup> If so, we recommend using the estimates from the Plan. Otherwise, we will recommend adjustments to those estimates based on our analysis results.

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<sup>5</sup> Elasticities are available online at <http://www.vtpi.org/elasticities.pdf>. Local elasticities will also be requested from local transit service providers.

<sup>6</sup> We will update the input numbers in the TIDA Transportation Plan to reflect the current proposed project (and associated improvements) to ensure an apples-to-apples comparison.

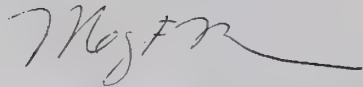
We hope this letter has provided sufficient detail describing our proposed approach, but are more than happy to provide additional detail or supporting documentation if requested.

Sincerely,

FEHR & PEERS



Chris Mitchell, PE  
Associate



Meghan Mitman  
Transportation Planner

SF07-0340



TREASURE ISLAND AM PEAK  
PROJECT SCALE 4Ds ADJUSTMENT WORKSHEET - HBW Full Elasticity

Region
3
(Enter the number corresponding to your region in table to the right)

Region Table

1 Sacramento County  
2 Contra Costa County  
3 CCTA with sampling for S/W coverage; density correction  
4 0  
5 0  
6 0  
7 0  
8 0  
9 0  
10 0

	Project Site		Other Uses Within 1/2 Mile		Total Uses Within 1/2 Mile	
	DUs	Acres	DUs	Acres	DUs	Acres
Residential Land Uses						
Single-Family Dwellings	0	0			0	0
Hotel dwellings	500	7			500	7
Mult-Family Dwellings	6,000	101	80	15	6,080	116
Total	6,500	108	80	15	6,580	123

	Jobs		Jobs		Jobs	
	Acres		Acres		Acres	
Retail Employment						
Regional Commercial	310	10			310	10
Neighborhood Shopping	230	9			230	9
Total	540	19	0	0	540	19

	Jobs		Jobs		Jobs	
	Acres		Acres		Acres	
Non-Retail Employment						
Industrial-PDR	160	11			160	11
Institutional - police, school, sailing, community center	135	12	300	67	435	79
Hotel	449	7			449	7
Museum/Entertainment	192	19			192	19
Office	340	10			340	10
Total	1,276	59	300	67	1,576	126

Walkable Design	Project	Regional Average	Green-shaded cells are for inputs
Sidewalk Coverage	100%	82%	Blue-font cells are for regional data
Route Directness	0.70	0.57	Purple-shaded cells are outputs
Average Blockface (miles)	0.11	0.17	
Street density	18.18	11.76	

Computation of 4Ds	Project Area	ITE Typical	Percent Difference	4Ds Adjustment for HBW		4Ds Adjustment for HBO		4Ds Adjustment for NHB	
				VT	VMT	VT	VMT	VT	VMT
Net Residential Density	53.50	15.00	256.64%	-30.03%	-61.08%	-30.54%	-34.13%	0.00%	0.00%
Net Employment Density	14.59	25.00	-41.63%	0.00%	0.00%	0.00%	0.00%	14.11%	15.00%
JobMix Diversity	0.90	0.25	259.76%	0.00%	0.00%	0.00%	0.00%	-65.00%	-65.00%
Jobs/Housing Diversity	0.46	0.10	362.18%	-21.37%	-65.00%	-15.94%	-57.95%	0.00%	0.00%
Design	4.08	3.64	11.97%	0.00%	0.00%	-0.38%	-0.36%	0.00%	0.00%
4D Adjustment BEFORE Ceiling & Floor				0.55	0.14	0.58	0.28	0.40	0.40
4D Adjustment AFTER Ceiling & Floor				0.55	0.35	0.58	0.35	0.40	0.40

Trip Purpose	% of All VT*	Adjustment		
		VT	VMT	
Home-Based Work (HBW)	42.4%	0.55	0.35	Regional Retail/Non-Retail Ratio 0.28
Home-Based Other (HBO)	55.1%	0.58	0.35	
Non-Home-Based (NHB)	2.5%	0.40	0.40	Regional Jobs/Housing Ratio 1.07
Total	100.0%	0.56	0.35	
% VT Internalized		43.6%		

Settings Used in this Scenario							
4D Elasticities from SACOG household surveys	Net Res. Density	Net Emp. Density	Jobmix Diversity	Jobs/HH Diversity	Index Design	HBW Destinations	Non- HBW
VT Elasticities							
HBW	-0.117			-0.059	0.000	-0.375	
HBO	-0.119			-0.044	-0.032		-0.408
NHB		-0.339	-0.462		0.000		-0.622
VMT Elasticities							
HBW	-0.238			-0.260	0.000	-1.234	
HBO	-0.133			-0.160	-0.030		-1.405
NHB		-0.444	-0.459		0.000		-1.318
Maximum allowable percentage change for any of the individual 4 Ds	600%					Ceiling and Floor Values Maximum allowable 4D adjustment for any individual trip purpose	15% -65%
Maximum allow change from all factors combined =	65%						

	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T
1	TREASURE ISLAND AM PEAK																			
2	PROJECT SCALE 4Ds ADJUSTMENT WORKSHEET - HBW Half Elasticity																			
3	Region		3 (Enter the number corresponding to your region in table to the right)																	
4																				
5			Project Site				Other Uses Within 1/2 Mile				Total Uses									
6	Residential Land Uses		DUs		Acres		DUs		Acres		DUs		Acres		DUs		Acres			
7	Single-Family Dwellings		0		0						0		0							
8	Hotel dwellings		500		7						500		7							
9	Mult-Family Dwellings		6,000		101		80		15		6,080		116							
10	Total		6,500		108		80		15		6,580		123							
11																				
12																				
13	Retail Employment		Jobs		Acres		Jobs		Acres		Jobs		Acres							
14	Regional Commercial		310		10						310		10							
15	Neighborhood Shopping		230		9						230		9							
16	Total		540		19		0		0		540		19							
17																				
18	Non-Retail Employment		Jobs		Acres		Jobs		Acres		Jobs		Acres							
19	Industrial-PDR		160		11						160		11							
20	Institutional - police, school, sailing, community center		135		12		300		67		435		79							
21	Hotel		449		7						449		7							
22	Museum/Entertainment		192		19						192		19							
23	Office		340		10						340		10							
24	Total		1,276		59		300		67		1,576		126							
25																				
26																				
27	Walkable Design		Project		Regional Average		Green-shaded cells are for inputs													
28	Sidewalk Coverage		100%		82%		Blue-font cells are for regional data													
29	Route Directness		0.70		0.57		Purple-shaded cells are outputs													
30	Average Blockface (miles)		0.11		0.17															
31	Street density		18.18		11.76															
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**Region Table**

1 Sacramento County

2 Contra Costa County

3 CCTA with sampling for S/W coverage; density correction

4 0

5 0

6 0

7 0

8 0

9 0

10 0

Computation of 4Ds	Project Area	ITE Typical	Percent Difference	4Ds Adjustment for HBW		4Ds Adjustment for HBO		4Ds Adjustment for NHB	
				VT	VMT	VT	VMT	VT	VMT
Net Residential Density	53.50	15.00	256.64%	-30.03%	-61.08%	-30.54%	-34.13%	0.00%	0.00%
Net Employment Density	14.59	25.00	-41.63%	0.00%	0.00%	0.00%	0.00%	14.11%	15.00%
JobMix Diversity	0.90	0.25	259.76%	0.00%	0.00%	0.00%	0.00%	-65.00%	-65.00%
Jobs/Housing Diversity	0.46	0.10	362.18%	-10.68%	-65.00%	-15.94%	-57.95%	0.00%	0.00%
Design	4.08	3.64	11.97%	0.00%	0.00%	-0.38%	-0.36%	0.00%	0.00%
4D Adjustment BEFORE Ceiling & Floor				0.62	0.14	0.58	0.28	0.40	0.40
4D Adjustment AFTER Ceiling & Floor				0.62	0.35	0.58	0.35	0.40	0.40

Trip Purpose	% of All VT*	Adjustment	
		VT	VMT
Home-Based Work (HBW)	42.4%	0.62	0.35
Home-Based Other (HBO)	55.1%	0.58	0.35
Non-Home-Based (NHB)	2.5%	0.40	0.40
Total	100.0%	0.60	0.35
% VT Internalized		40.5%	

Regional Retail/Non-Retail Ratio 0.28

Regional Jobs/Housing Ratio 1.07

**Settings Used in this Scenario**

4D Elasticities from SACOG household surveys	Net Res. Density	Net Emp. Density	Jobmix Diversity	Jobs/HH Diversity	Index Design	HBW Non- HBW Destinations
VT Elasticities						
HBW	-0.117			-0.030	0.000	-0.375
HBO	-0.119			-0.044	-0.032	-0.408
NHB		-0.339	-0.462		0.000	-0.822
VMT Elasticities						
HBW	-0.238			-0.260	0.000	-1.234
HBO	-0.133			-0.160	-0.030	-1.405
NHB		-0.444	-0.459		0.000	-1.318

Maximum allowable percentage change for any of the individual 4 Ds 600%

Maximum allow change from all factors combined = 65%

**Ceiling and Floor Values**

Maximum allowable 4D adjustment for any individual trip purpose 15%  
-65%



	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T
1	<b>TREASURE ISLAND AM PEAK</b>																			
2	<b>PROJECT SCALE 4Ds ADJUSTMENT WORKSHEET - HBW Zero Elasticity</b>																			
3	Region		3		(Enter the number corresponding to your region in table to the right)															
4																				
5																				
6	Residential Land Uses		Project Site		Other Uses Within 1/2 Mile				Total Uses Within 1/2 Mile											
7			DUs	Acres	DUs	Acres	DUs	Acres	DUs	Acres										
8	Single-Family Dwellings		0	0					0	0										
9	Hotel dwellings		500	7					500	7										
10	Mult-Family Dwellings		6,000	101	80 15				6,080	116										
11	Total		6,500	108	80 15				6,580	123										
12																				
13	Retail Employment		Jobs	Acres	Jobs	Acres	Jobs	Acres												
14	Regional Commercial		310	10					310	10										
15	Neighborhood Shopping		230	9					230	9										
16	Total		540	19	0 0				540	19										
17																				
18	Non-Retail Employment		Jobs	Acres	Jobs	Acres	Jobs	Acres												
19	Industrial-PDR		160	11					160	11										
20	Institutional - police, school, sailing, community center				300 67				435 79											
21	Hotel		449	7					449	7										
22	Museum/Entertainment		192	19					192	19										
23	Office		340	10					340	10										
24	Total		1,276	59	300 67				1,576	126										
25																				
26																				
27	Walkable Design		Project	Regional Average																
28	Sidewalk Coverage		100%	82%																
29	Route Directness		0.70	0.57																
30	Average Blockface (miles)		0.11	0.17																
31	Street density		18.18	11.76																
32																				
33																				
34	Computation of 4Ds		Project Area	ITE Typical	Percent Difference	4Ds Adjustment for HBW		4Ds Adjustment for HBO		4Ds Adjustment for NHB										
35						VT	VMT	VT	VMT	VT	VMT									
36	Net Residential Density		53.50	15.00	256.64%	-30.03%	-61.08%	-30.54%	-34.13%	0.00%	0.00%									
37	Net Employment Density		14.59	25.00	-41.63%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	14.11%	15.00%							
38	JobMix Diversity		0.90	0.25	259.76%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	-65.00%	-65.00%							
39	Jobs/Housing Diversity		0.46	0.10	362.18%	0.00%	-65.00%	-15.94%	-57.95%	0.00%	0.00%	0.00%	0.00%							
40	Design		4.08	3.64	11.97%	0.00%	0.00%	-0.38%	-0.36%	0.00%	0.00%									
41																				
42	4D Adjustment BEFORE Ceiling & Floor					0.70	0.14	0.58	0.28	0.40	0.40									
43	4D Adjustment AFTER Ceiling & Floor					0.70	0.35	0.58	0.35	0.40	0.40									
44																				
45																				
46	Trip Purpose		% of All VT*	Adjustment																
47				VT	VMT															
48	Home-Based Work (HBW)		42.4%	0.70	0.35															
49	Home-Based Other (HBO)		55.1%	0.58	0.35															
50	Non-Home-Based (NHB)		2.5%	0.40	0.40															
51	Total		100.0%	0.63	0.35															
52	% VT Internalized		37.3%																	
53																				
54																				
55																				
56																				
57																				
58																				
59	Settings Used in this Scenario																			
60	4D Elasticities from SACOG household surveys		Net Res. Density	Net Emp. Density	Jobmix Diversity	Jobs/HH Diversity	Index Design	HBW Destinations	Non- HBW Destinations											
61	VT Elasticities																			
62	HBW		-0.117			0.000	0.000	-0.375												
63	HBO		-0.119			-0.044	-0.032		-0.408											
64	NHB			-0.339	-0.462		0.000		-0.822											
65	VMT Elasticities																			
66	HBW		-0.238			-0.260	0.000	-1.234												
67	HBO		-0.133			-0.160	-0.030		-1.405											
68	NHB			-0.444	-0.459		0.000		-1.318											
69																				
70	Maximum allowable percentage change for any of the individual 4Ds		600%			Ceiling and Floor Values														
71						Maximum allowable 4D adjustment for any individual trip purpose		15%												
72								-65%												
73	Maximum allow change from all factors combined =		65%																	
74																				

**Region Table**

1 Sacramento County

2 Contra Costa County

3 CCTA with sampling for S/W coverage; density correction

4 0

5 0

6 0

7 0

8 0

9 0

10 0

Green-shaded cells are for inputs

Blue-font cells are for regional data

Purple shaded cells are outputs

	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T
1	TREASURE ISLAND PM PEAK																			
2	PROJECT SCALE 4Ds ADJUSTMENT WORKSHEET - HBW Full Elasticity																			
3	Region		3 (Enter the number corresponding to your region in table to the right)																	
4			Project Site				Other Uses Within 1/2 Mile				Total Uses Within 1/2 Mile									
5			DUs		Acres		DUs		Acres		DUs		Acres							
6	Residential Land Uses																			
7	Single-Family Dwellings		0		0						0		0							
8	Hotel dwellings		500		7						500		7							
9	Multi-Family Dwellings		6,000		101		80		15		6,080		116							
10	Total		6,500		108		80		15		6,580		123							
11																				
12																				
13	Retail Employment		Jobs		Acres		Jobs		Acres		Jobs		Acres							
14	Regional Commercial		310		10						310		10							
15	Neighborhood Shopping		230		9						230		9							
16	Total		540		19		0		0		540		19							
17																				
18	Non-Retail Employment		Jobs		Acres		Jobs		Acres		Jobs		Acres							
19	Industrial-PDR		160		11						160		11							
20	Institutional - police, school,		135		12		300		67		435		79							
21	Hotel		449		7						449		7							
22	Museum/Entertainment		192		19						192		19							
23	Office		340		10						340		10							
24	Total		1,276		59		300		67		1,576		126							
25																				
26																				
27	Walkable Design		Project		Regional Average		Green-shaded cells are for inputs													
28	Sidewalk Coverage		100%		82%		Blue-font cells are for regional data													
29	Route Directness		0.70		0.57		Purple-shaded cells are outputs													
30	Average Blockface (miles)		0.11		0.17															
31	Street density		18.18		11.76															
32																				
33																				
34																				
35	Computation of 4Ds		Project Area		ITE Typical		Percent Difference		4Ds Adjustment for HBW		4Ds Adjustment for HBO		4Ds Adjustment for NHB							
36									VT		VMT		VT		VMT		VT		VMT	
37	Net Residential Density		53.50		15.00		256.64%		-30.03%		-61.08%		-30.54%		-34.13%		0.00%		0.00%	
38	Net Employment Density		14.59		25.00		-41.63%		0.00%		0.00%		0.00%		0.00%		14.11%		15.00%	
39	JobMix Diversity		0.90		0.25		259.76%		0.00%		0.00%		0.00%		0.00%		-65.00%		-65.00%	
40	Jobs/Housing Diversity		0.46		0.10		362.18%		-21.37%		-65.00%		-15.94%		-57.95%		0.00%		0.00%	
41	Design		4.08		3.64		11.97%		0.00%		0.00%		-0.38%		-0.36%		0.00%		0.00%	
42	4D Adjustment BEFORE Ceiling & Floor								0.55		0.14		0.58		0.28		0.40		0.40	
43	4D Adjustment AFTER Ceiling & Floor								0.55		0.35		0.58		0.35		0.40		0.40	
44																				
45																				
46	Trip Purpose		% of All VT*		Adjustment															
47					VT		VMT													
48	Home-Based Work (HBW)		40.8%		0.55		0.35													
49	Home-Based Other (HBO)		42.4%		0.58		0.35													
50	Non-Home-Based (NHB)		16.8%		0.40		0.40													
51	Total		100.0%		0.54		0.36													
52	% VT Internalized				46.2%															
53																				
54																				
55																				
56																				
57																				
58																				
59	Settings Used in this Scenario																			
60	4D Elasticities from SACOG household surveys		Net Res. Density		Net Emp. Density		Jobmix Diversity		Jobs/HH Diversity		Index Design		HBW Destinations		Non- HBW Destinations					
61	VT Elasticities																			
62	HBW		-0.117						-0.059		0.000		-0.375							
63	HBO		-0.119						-0.044		-0.032				-0.408					
64	NHB				-0.339		-0.462				0.000				-0.822					
65	VMT Elasticities																			
66	HBW		-0.238						-0.260		0.000		-1.234							
67	HBO		-0.133						-0.160		-0.030				-1.405					
68	NHB				-0.444		-0.459				0.000				-1.318					
69																				
70	Maximum allowable percentage change for any of the individual 4 Ds				600%															
71																				
72																				
73																				
74																				

**Region Table**

1 Sacramento County

2 Contra Costa County

3 CCTA with sampling for S/W coverage; density correction

4 0

5 0

6 0

7 0

8 0

9 0

10 0

**Green-shaded cells are for inputs**

**Blue-font cells are for regional data**

**Purple-shaded cells are outputs**

**Regional Retail/Non-Retail Ratio** 0.28

**Regional Jobs/Housing Ratio** 1.07

**Ceiling and Floor Values**

Maximum allowable 4D adjustment for any individual trip purpose 15%

Maximum allow change from all factors combined = 65%



	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T
1	TREASURE ISLAND PM PEAK																			
2	PROJECT SCALE 4Ds ADJUSTMENT WORKSHEET - HBW Half Elasticity																			
3	Region		3 (Enter the number corresponding to your region in table to the right)																	
4																				
5																				
6	Residential Land Uses		Project Site		Other Uses Within 1/2 Mile				Total Uses Within 1/2 Mile											
7			DUs	Acres	DUs	Acres	DUs	Acres	DUs	Acres	DUs	Acres	DUs	Acres	DUs	Acres	DUs	Acres	DUs	Acres
8	Single-Family Dwellings		0	0					0	0					0	0				
9	Hotel dwellings		500	7					500	7					500	7				
10	Multi-Family Dwellings		6,000	101					6,080	116					6,080	116				
11	Total		6,500	108	80	15	80	15	6,580	123					6,580	123				
12																				
13	Retail Employment		Jobs		Acres		Jobs		Acres		Jobs		Acres		Jobs		Acres			
14	Regional Commercial		310	10					310	10					310	10				
15	Neighborhood Shopping		230	9					230	9					230	9				
16	Total		540	19	0	0	0	0	540	19					540	19				
17																				
18	Non-Retail Employment		Jobs		Acres		Jobs		Acres		Jobs		Acres		Jobs		Acres			
19	Industrial-PDR		160	11					160	11					160	11				
20	Institutional - police, school,		135	12					435	79					435	79				
21	Hotel		449	7					449	7					449	7				
22	Museum/Entertainment		192	19					192	19					192	19				
23	Office		340	10					340	10					340	10				
24	Total		1,276	59	300	67	300	67	1,576	126					1,576	126				
25																				
26																				
27	Walkable Design		Project		Regional Average															
28	Sidewalk Coverage		100%	82%																
29	Route Directness		0.70	0.57																
30	Average Blockface (miles)		0.11	0.17																
31	Street density		18.18	11.76																
32																				
33																				
34																				
35	Computation of 4Ds		Project Area	ITE Typical	Percent Difference	4Ds Adjustment for HBW		4Ds Adjustment for HBO		4Ds Adjustment for NHB										
36						VT	VMT	VT	VMT	VT	VMT	VT	VMT	VT	VMT	VT	VMT	VT	VMT	
37	Net Residential Density		53.50	15.00	256.64%	-30.03%	-61.08%	-30.54%	-34.13%	0.00%	0.00%	0.00%	0.00%	14.11%	15.00%	0.00%	0.00%	0.00%	0.00%	
38	Net Employment Density		14.59	25.00	-41.63%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	
39	JobMix Diversity		0.90	0.25	259.76%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	-65.00%	-65.00%	0.00%	0.00%	0.00%	0.00%	
40	Jobs/Housing Diversity		0.46	0.10	362.18%	-10.68%	-65.00%	-15.94%	-57.95%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	
41	Design		4.08	3.64	11.97%	0.00%	0.00%	-0.38%	-0.36%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	
42	4D Adjustment BEFORE Ceiling & Floor					0.62	0.14	0.58	0.28	0.40	0.40									
43	4D Adjustment AFTER Ceiling & Floor					0.62	0.35	0.58	0.35	0.40	0.40									
44																				
45																				
46																				
47	Trip Purpose		% of All	Adjustment																
48			VT*	VT	VMT															
49	Home-Based Work (HBW)		40.8%	0.62	0.35															
50	Home-Based Other (HBO)		42.4%	0.58	0.35															
51	Non-Home-Based (NHB)		16.8%	0.40	0.40															
52	Total		100.0%	0.57	0.36															
53	% VT Internalized			43.1%																
54																				
55																				
56																				
57																				
58	Settings Used in this Scenario																			
59	4D Elasticities from SACOG household surveys		Net Res. Density	Net Emp. Density	Jobmix Diversity	Jobs/HH Diversity	Index Design	HBW Destinations	Non- HBW											
60	VT Elasticities																			
61	HBW		-0.117			-0.030	0.000	-0.375												
62	HBO		-0.119			-0.044	-0.032		-0.408											
63	NHB			-0.339	-0.462		0.000		-0.822											
64	VMT Elasticities																			
65	HBW		-0.238			-0.260	0.000	-1.234												
66	HBO		-0.133			-0.160	-0.030		-1.405											
67	NHB			-0.444	-0.459		0.000		-1.318											
68																				
69	Maximum allowable percentage change for any of the individual 4Ds		600%																	
70	Ceiling and Floor Values																			
71	Maximum allowable 4D adjustment for any individual trip purpose		15%															-65%		
72																				
73	Maximum allow change from all factors combined =		65%																	
74																				

**Region Table**

1 Sacramento County

2 Contra Costa County

3 CCTA with sampling for S/W coverage; density correction

4 0

5 0

6 0

7 0

8 0

9 0

10 0

	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T
1	TREASURE ISLAND PM PEAK																			
2	PROJECT SCALE 4Ds ADJUSTMENT WORKSHEET - HBW Zero Elasticity																			
3	Region		3		(Enter the number corresponding to your region in table to the right)															
4					Other Uses Within 1/2 Mile				Total Uses Within 1/2 Mile											
5			Project Site																	
6	Residential Land Uses		DUs	Acres	DUs	Acres	DUs	Acres	DUs	Acres										
7	Single-Family Dwellings		0	0			0	0												
8	Hotel dwellings		500	7			500	7												
9	Multi-Family Dwellings		6,000	101	80	15	6,080	116												
10	Total		6,500	108	80	15	6,580	123												
11																				
12																				
13	Retail Employment		Jobs	Acres	Jobs	Acres	Jobs	Acres												
14	Regional Commercial		310	10			310	10												
15	Neighborhood Shopping		230	9			230	9												
16	Total		540	19	0	0	540	19												
17																				
18	Non-Retail Employment		Jobs	Acres	Jobs	Acres	Jobs	Acres												
19	Industrial-PDR		160	11			160	11												
20	Institutional - police, school,		135	12	300	67	435	79												
21	Hotel		449	7			449	7												
22	Museum/Entertainment		192	19			192	19												
23	Office		340	10			340	10												
24	Total		1,276	59	300	67	1,576	126												
25																				
26																				
27	Walkable Design		Project	Regional Average	Green-shaded cells are for inputs															
28	Sidewalk Coverage		100%	82%	Blue-font cells are for regional data															
29	Route Directness		0.70	0.57	Purple-shaded cells are outputs															
30	Average Blockface (miles)		0.11	0.17																
31	Street density		18.18	11.76																
32																				
33																				
34																				
35	Computation of 4Ds		Project Area	ITE Typical	Percent Difference	4Ds Adjustment for HBW		4Ds Adjustment for HBO		4Ds Adjustment for NHB										
36						VT	VMT	VT	VMT	VT	VMT									
37	Net Residential Density		53.50	15.00	256.64%	-30.03%	-61.08%	-30.54%	-34.13%	0.00%	0.00%									
38	Net Employment Density		14.59	25.00	-41.63%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	14.11%	15.00%							
39	JobMix Diversity		0.90	0.25	259.76%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	-65.00%	-65.00%							
40	Jobs/Housing Diversity		0.46	0.10	362.18%	0.00%	-65.00%	-15.94%	-57.95%	0.00%	0.00%	0.00%	0.00%							
41	Design		4.08	3.64	11.97%	0.00%	0.00%	-0.38%	-0.36%	0.00%	0.00%									
42	HBW Destinations		1.000																	
43	4D Adjustment BEFORE Ceiling & Floor					0.70	0.14	0.58	0.28	0.40	0.40									
44	4D Adjustment AFTER Ceiling & Floor					0.70	0.35	0.58	0.35	0.40	0.40									
45																				
46	Trip Purpose		% of All VT*	Adjustment																
47				VT	VMT															
48	Home-Based Work (HBW)		40.8%	0.70	0.35															
49	Home-Based Other (HBO)		42.4%	0.58	0.35															
50	Non-Home-Based (NHB)		16.8%	0.40	0.40															
51	Total		100.0%	0.60	0.36															
52	% VT Internalized			40.1%																
53																				
54																				
55																				
56																				
57																				
58	Settings Used in this Scenario																			
59	4D Elasticities from SACOG household surveys		Net Res. Density	Net Emp. Density	Jobmix Diversity	Jobs/HH Diversity	Index Design	HBW Destinations	Non- HBW Destinations											
60	VT Elasticities																			
61	HBW		-0.117			0.000	0.000	-0.375												
62	HBO		-0.119			-0.044	-0.032		-0.408											
63	NHB			-0.339	-0.462		0.000		-0.822											
64	VMT Elasticities																			
65	HBW		-0.238			-0.260	0.000	-1.234												
66	HBO		-0.133			-0.160	-0.030		-1.405											
67	NHB			-0.444	-0.459		0.000		-1.318											
68																				
69	Maximum allowable percentage change for any of the individual 4 Ds		600%																	
70																				
71	Ceiling and Floor Values																			
72	Maximum allowable 4D adjustment for any individual trip purpose		15%																	
73			-65%																	
74	Maximum allow change from all factors combined =		65%																	

**Region Table**

1 Sacramento County

2 Contra Costa County

3 CCTA with sampling for S/W coverage; density correction

4 0

5 0

6 0

7 0

8 0

9 0

10 0





Table A-1  
Treasure Island Trip Generation: High Transit Service Scenario

	Category	Total Use SF	Units	Land Use	ITE Land Use Code	AM ITE Trip Generation						Work %	Non-work %	Internal Trip %	Internal Trip Reduction (VT)	External Trips (ITE less internalization, pass-by, and diverted)			Ferry %	Bus %	People Per Car	External Ferry Trips (Person Trips)			External Bus Trips (Person Trips)			Vehicle Trips Replaced by Transit		External Vehicle Trips					
						Rate or Eqn	AM Trips (VT)		%In	%Out	AM Trips In (VT)					AM Trips Out (VT)	PM In (VT)	PM Out (VT)				PM Total (VT)	Ferry %	Bus %	People Per Car	PM In	PM Out	PM Total	PM In	PM Out	PM Total	PM Total	PM In	PM Out	PM Total
AM Peak Period	RETAIL	115.0	ksf	Neighborhood Serving - Ancillary																															
		87.0	ksf	Shopping Center	820	Eqn	246	61%	39%	150	96	8%	92%	37%	91	95	80	155	7%	12%	1.6	16	10	27	28	18	45	45	67	43	110				
		28.0	ksf	Grocery Store	850	Rate	156	61%	39%	95	61	8%	92%	37%	58	60	38	96	7%	12%	1.6	10	7	17	18	11	29	29	42	27	70				
		155.0	ksf	Lifestyle • Entertainment Retail																															
		54.0	ksf	Restaurant	932	Rate	529	52%	48%	275	254	8%	92%	37%	196	173	160	333	7%	12%	1.6	30	28	58	51	47	98	97	123	113	236				
		101.0	ksf	Shopping Center	820	Eqn	269	61%	38%	164	105	8%	92%	37%	100	103	66	169	7%	12%	1.6	18	11	29	30	19	50	49	73	47	120				
	COMMERCIAL / ADAPTIVE REUSE	325.0	ksf	Buildings 1, 2, and 3																															
		85.0	ksf	General Office	710	Eqn	165	88%	12%	145	20	50%	50%	37%	61	91	12	104	11%	14%	1.6	27	4	30	33	4	37	42	54	7	62				
		80.0	ksf	Manufacturing	140	Rate	59	77%	23%	45	14	50%	50%	37%	22	29	9	37	11%	14%	1.6	8	2	11	10	3	13	15	17	5	22				
		150.0	ksf	Multiplex Movie Theater	445		0					50%	50%	37%	0	0	0	0	11%	14%	1.6	0	0	0	0	0	0	0	0	0	0	0			
	INSTITUTIONAL	135.0	ksf																																
		105.0	ksf	Elementary School	520	Rate	493	54%	46%	266	227	50%	50%	37%	182	168	143	311	11%	14%	1.6	49	42	91	60	51	111	126	100	85	185				
		30.0	ksf	Police Fire Station	730	Rate	176	84%	16%	149	29	50%	50%	37%	66	94	18	112	11%	14%	1.6	27	5	33	34	4	40	45	56	11	67				
		114.0	ksf	Recreational Comm Center	495	Rate	23	61%	39%	14	9	8%	92%	37%	9	9	6	14	7%	12%	1.6	2	1	3	3	2	4	4	6	4	10				
		15.0	ksf	Sailing Center	420	Rate	24	33%	67%	8	16	8%	92%	37%	9	5	10	15	7%	12%	1.6	1	2	3	1	2	4	4	4	7	11				
	300	acres	Open Space		Rate	82	80%	20%	65	17	5%	95%	37%	30	41	10	52	7%	11%	1.6	7	2	9	12	3	15	15	30	7	37					
HOTELS	500.0	rooms																																	
	50.0	rooms	Resort Hotel	330	Rate	17	72%	28%	12	5	45%	55%	37%	6	8	3	11	11%	14%	1.6	2	1	3	3	1	4	4	5	2	7					
	10.0	rooms	Hotel	310	Eqn	86	61%	39%	52	34	45%	55%	37%	32	33	21	54	11%	14%	1.6	9	6	15	12	7	19	21	20	13	33					
	390.0	rooms	Hotel	310	Eqn	470	61%	39%	287	183	45%	55%	37%	174	181	115	296	11%	14%	1.6	50	32	82	63	40	103	116	110	70	180					
RESIDENTIAL	6000	units																																	
	1454.0	units	Residential Townhouse	230	Rate	641	17%	83%	109	532	50%	50%	37%	237	69	335	404	11%	14%	1.6	20	98	118	24	119	144	163	41	200	240					
	1550.0	units	Apartment	220	Rate	793	20%	80%	159	634	50%	50%	37%	293	100	400	500	11%	14%	1.6	29	116	146	36	142	178	202	59	238	297					
	2876.0	units	Mid-Rise Apartment	222	Rate	864	25%	75%	216	648	50%	50%	37%	320	136	408	544	11%	14%	1.6	40	119	159	48	145	194	220	81	243	324					
	117.0	units	Air Suites Hotel	311	Rate	46	55%	45%	25	21	50%	50%	37%	17	16	13	29	11%	14%	1.6	5	4	8	6	5	10	12	9	8	17					
grand total							5,141	43%	57%	2,236	2,905		37%	1,902	1,410	1,829	3,239				350	489	840	470	628	1,098	1,211	898	1,130	2,028					
PM Peak Period	Category	Total Use SF	Units	Land Use	ITE Land Use Code	Rate or Eqn	PM Trips (VT)	%In	%Out	PM Trips In (VT)	PM Trips Out (VT)	Work %	Non-work %	Internal Trip %	Internal Trip Reduction (VT)	PM In (VT)	PM Out (VT)	PM Total (VT)	Ferry %	Bus %	People Per Car	PM In	PM Out	PM Total	PM In	PM Out	PM Total	PM In	PM Out	PM Total	PM Total	PM In	PM Out	PM Total	
	RETAIL	115.0	ksf	Neighborhood Serving - Ancillary																															
		87.0	ksf	Shopping Center	820	Eqn	971	48%	52%	466	505	8%	92%	40%	388	280	303	583	7%	12%	1.6	51	55	106	86	93	179	178	194	210	404				
		28.0	ksf	Grocery Store	850	Eqn	581	51%	49%	296	285	8%	92%	40%	232	178	171	349	7%	12%	1.6	32	31	64	55	53	107	107	123	119	242				
		155.0	ksf	Lifestyle • Entertainment Retail																															
		54.0	ksf	Restaurant	932	Rate	1,003	61%	39%	612	391	8%	92%	40%	401	367	235	602	7%	12%	1.6	67	43	110	113	72	185	184	255	163	418				
		101.0	ksf	Shopping Center	820	Eqn	1,073	48%	52%	515	558	8%	92%	40%	429	309	335	644	7%	12%	1.6	56	61	117	95	103	198	197	214	232	447				
	COMMERCIAL / ADAPTIVE REUSE	325.0	ksf	Buildings 1, 2, and 3																															
		85.0	ksf	General Office	710	Eqn	175	17%	83%	30	145	50%	50%	40%	70	18	87	105	11%	14%	1.6	5	27	32	7	3	39	45	10	50	60				
		80.0	ksf	Manufacturing	140	Rate	60	36%	64%	22	38	50%	50%	40%	24	13	23	36	11%	14%	1.6	4	7	11	5	3	13	15	7	13	20				
		150.0	ksf	Multiplex movie theater	445	Eqn	1,056	64%	36%	678	380	50%	50%	40%	422	406	228	634	11%	14%	1.6	124	70	194	152	65	237	269	233	131	364				
	INSTITUTIONAL	135.0	ksf																																
		105.0	ksf	Elementary School	520	Rate	330	43%	57%	142	188	100%	0%	40%	132	85	113	198	17%	17%	1.6	39	51	90	39	41	80	112	37	49	86				
		30.0	ksf	Police Fire Station	730	Rate	38	31%	69%	12	26	50%	50%	40%	15	7	16	23	11%	14%	1.6	2	5	7	3	3	6	10	4	9	13				
		114.0	ksf	Recreational Comm Center	495	Rate	23	29%	71%	7	16	8%	92%	40%	9	4	10	14	7%	12%	1.6	1	2	3	1	3	4	4	3	7	11				
	15.0	ksf	Sailing Center	420	Rate	55	60%	40%	33	22	8%	92%	40%	22	20	13	33	7%	12%	1.6	4	2	6	6	4	10	10	14	9	23					
	300	acres	Regional Park	420	Rate	160	41%	59%	66	94	5%	95%	40%	64	39	57	96	7%	11%	1.6	7	10	17	12	17	29	29	28	40	67					
HOTEL	500.0	rooms																																	
	50.0	rooms	Resort Hotel	330	Rate	22	43%	57%	10	12	45%	55%	40%	9	6	8	13	11%	14%	1.6	2	2	4	2	3	5	5	3	4	8					
	10.0	rooms	Hotel	310	Rate	42	53%	47%	22	20	45%	55%	40%	17	13	12	25	11%	14%	1.6	4	3	7	5	4	9	10	8	7	15					
	390.0	rooms	Hotel	310	Rate	225	53%	47%	119	108	45%	55%	40%	90	72	63	135	11%	14%	1.6	21	18	39	26	3	49	55	42	37	89					
RESIDENTIAL	6000	units																																	
	1454.0	units	Residential Townhouse	230	Rate	757	67%	33%	507	250	50%	50%	40%	303	304	150	454	11%	14%	1.6	93	46	139	114	46	170	193	175	88	263					
	1550.0	units	Apartment	220	Rate	964	65%	35%	626	338	50%	50%	40%	386	376	202	578	11%	14%	1.6	115	62	177	141	46	216	246	216	116	332					
	2876.0	units	Mid-Rise Apartment	222	Rate	1,008	61%	39%	615	393	50%	50%	40%	403	369	236	605	11%	14%	1.6	113	72	185	138	48	226	257	212	136	348					
	117.0	units	Air Suites Hotel	311	Rate	48	45%	55%	22	26	50%	50%	40%	19	13	16																			





Table A-2

PM Peak Period

#### SERVICE ELASTICITY

source: <http://www.vpi.org/tranetas.pdf>





Appendix B – Comparisons of Existing and Future Traffic Volumes Among the MTC, SFCTA,  
and ACCMA Forecast Models

**Comparison of Existing and Future Traffic Volumes for Bay Bridge (Peak 1 Hour)**

PeMS					
	2008				
	WB APP	WB DEP	EB APP	EB DEP	
AM	8,740			7,153	
PM	7,340			9,013	

SFCTA (CHAMP 3.2)									
	2005					2030			
	WB APP	WB DEP	EB APP	EB DEP		WB APP	WB DEP	EB APP	EB DEP
AM	11,161	11,332	9,080	8,672		12,852	13,791	11,742	10,961
PM	8,934	9,192	10,224	9,992		10,207	11,097	11,706	10,367
						Delta			
	WB APP	WB DEP	EB APP	EB DEP		WB APP	WB DEP	EB APP	EB DEP
						1,691	2,459	2,662	2,289
						1,273	1,905	1,482	375

ACCMA (2007)									
	2005					2030			
	WB APP	WB DEP	EB APP	EB DEP		WB APP	WB DEP	EB APP	EB DEP
AM	12,140	12,242	6,970	6,856		17,978	17,901	8,320	7,388
PM	7,015	7,115	12,858	12,790		8,181	8,939	17,104	17,341
						Delta			
	WB APP	WB DEP	EB APP	EB DEP		WB APP	WB DEP	EB APP	EB DEP
						5,838	5,659	1,350	532
						1,166	1,824	4,246	4,551

MTC (2009 RTP)									
	2006					2035			
	WB APP	WB DEP	EB APP	EB DEP		WB APP	WB DEP	EB APP	EB DEP
AM	12,385	12,536	8,561	8,456		16,401	16,730	9,269	8,613
PM	8,795	8,951	13,753	13,691		10,097	11,026	16,937	16,466
						Delta			
	WB APP	WB DEP	EB APP	EB DEP		WB APP	WB DEP	EB APP	EB DEP
						4,016	4,194	708	157
						1,302	2,075	3,184	2,775

Adjusted MTC Model Outputs									
	2006					2035			
	WB APP	WB DEP	EB APP	EB DEP		WB APP	WB DEP	EB APP	EB DEP
AM	12,375	12,497	8,541	8,442		16,384	16,794	8,768	8,598
PM	8,771	8,918	13,703	13,599		10,100	10,572	17,084	16,520
						Delta			
	WB APP	WB DEP	EB APP	EB DEP		WB APP	WB DEP	EB APP	EB DEP
						4,009	4,297	227	156
						1,329	1,654	3,381	2,921



### Comparison of Existing and Future Growth Factors for Bay Bridge (Peak 1 Hour)

PeMS				
2008				
	WB APP	WB DEP	EB APP	EB DEP
AM	8,740			7,153
PM	7,340			9,013

SFCTA (CHAMP 3.2)									
2005					2030				
	WB APP	WB DEP	EB APP	EB DEP	WB APP	WB DEP	EB APP	EB DEP	% Growth
AM	11,161	11,332	9,080	8,672	12,852	13,791	11,742	10,961	15%
PM	8,934	9,192	10,224	9,992	10,207	11,097	11,706	10,367	14%
									21%
									26%
									4%

ACCMA (2007)									
2005					2030				
	WB APP	WB DEP	EB APP	EB DEP	WB APP	WB DEP	EB APP	EB DEP	% Growth
AM	12,140	12,242	6,970	6,856	17,978	17,901	8,320	7,388	48%
PM	7,015	7,115	12,858	12,790	8,181	8,939	17,104	17,341	17%
									26%
									33%
									36%

MTC (2009 RTP)									
2006					2035				
	WB APP	WB DEP	EB APP	EB DEP	WB APP	WB DEP	EB APP	EB DEP	% Growth
AM	12,385	12,536	8,561	8,456	16,401	16,730	9,269	8,613	32%
PM	8,795	8,951	13,753	13,691	10,097	11,026	16,937	16,466	15%
									23%
									20%

Adjusted MTC Model Outputs									
2006					2035				
	WB APP	WB DEP	EB APP	EB DEP	WB APP	WB DEP	EB APP	EB DEP	% Growth
AM	12,375	12,497	8,541	8,442	16,384	16,794	8,768	8,598	32%
PM	8,771	8,918	13,703	13,599	10,100	10,572	17,084	16,520	15%
									34%
									19%
									25%
									21%



# **Yerba Buena Island Ramps Project Traffic Operations Report**

## **1.0 INTRODUCTION**

This report documents the traffic operations on the San Francisco Oakland Bay Bridge (SFOBB) and its six (6) on- and off-ramps to and from Yerba Buena Island (YBI) in the eastbound and westbound directions. This report also analyses the operational difference between the existing and projected Build and No Build Alternative in the year 2035. There are no operational differences between the two Build Alternatives, Alternative 2b and Alternative 4, so they are referred to in this document as the Build Alternative.

The current geometric design of the ramps has remained mostly unchanged since the 1930s. The ramps do not meet Caltrans' standards, the on-ramp merge lengths and off-ramp deceleration lengths for the six ramps, and the entrances and exits at the I-80 / YBI interchange are non-standard; all of these conditions create operational constraints.

The goal of this report is to illustrate the geometric and operational condition of the existing on- and off-ramps and the affect they have on the mainline of the SFOBB; therefore illustrating the result of the No Build Alternative. The proposed project using the Build Alternative will improve geometry and operations by reconstructing two new ramps on the east side of YBI.

## **2.0 EXISTING CONDITIONS ANALYSIS**

### **2.1 Bay Bridge Travel Time**

Travel time runs for the Bay Bridge were performed during the morning and evening peak periods on October 7, 2008. The morning peak period hours fell between 6:30 AM – 9:30 AM and the evening peak period hours fell between of 3:30 PM – 6:30 PM. The travel time data was collected using a test car method known as the floating car technique. The floating car technique employs a test vehicle that is driven along the study route, the driver floats with the traffic by passing as many vehicles as pass the test car. This technique is preferred for capturing the typical driver behavior and vehicular operation of the selected study roadway.

#### **Test Car Study Sections**

The beginning and end points of each test car run were consistent, however, the study sections for each period varied slightly. In the eastbound direction, the starting point for the data collection was the merge onto I-80/Bay Bridge, from the First Street/Harrison Street on-ramp location; the ending point was 4.6 miles from the start just prior to the turnaround location at the toll plaza. In the westbound direction, the starting point for the data collection was an overhead sign location west of the toll plaza; the ending point location was 5.1 miles from start at the intersection of Fremont Street/Howard Street. The interim data location points were typically mile markers, as well as the on- and off-ramp locations on Yerba Buena Island. The following tables show the study collection points for each peak period.



**Table 1 – Travel Time Study Sections for Peak Period**

Westbound		Eastbound	
<i>Location Description</i>	<i>Post Mile (Abs)</i>	<i>Location Description</i>	<i>Post Mile (Abs)</i>
Start	6.69	Start	2.14
1 Mile	5.69	1 Mile	3.14
2 Mile	4.69	Off Ramp 1	4.14
Off Ramp 1	4.33	Off Ramp 2	4.39
On Ramp 1	4.24	On Ramp 1	4.51
On Ramp 2	4.06	3 Miles	5.14
3 Miles	3.69	4 Miles	6.14
End	2.69	End	6.69

### **Travel Time Results**

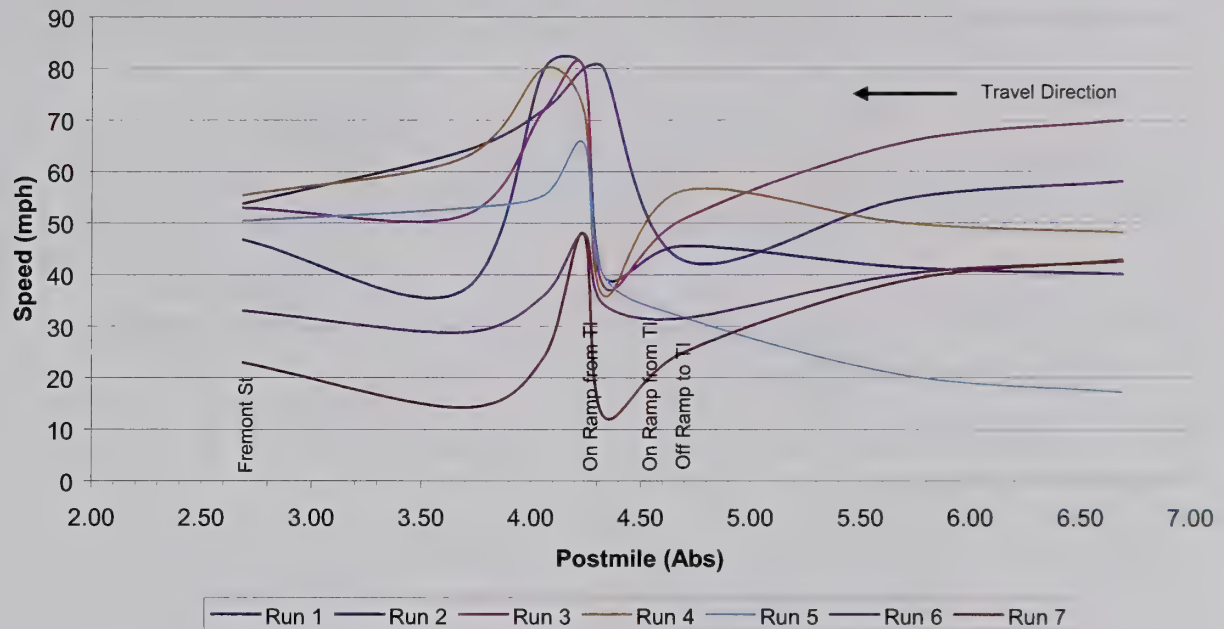
Figure 1 shows average travel speed calculated from the travel time study conducted on the Bay Bridge during morning and evening peak periods. Average travel speed was calculated from the recorded time at the post miles shown in Table 1. Each test car run is shown as an interpolation of the calculated travel speeds versus post mile.

During the morning and evening peak periods for the eastbound direction, speeds are fairly consistent between runs indicating minimal congestion and a low occurrence of reduced speed areas. Travel speeds for the morning peak period on average are greater than the evening peak period in the eastbound direction.

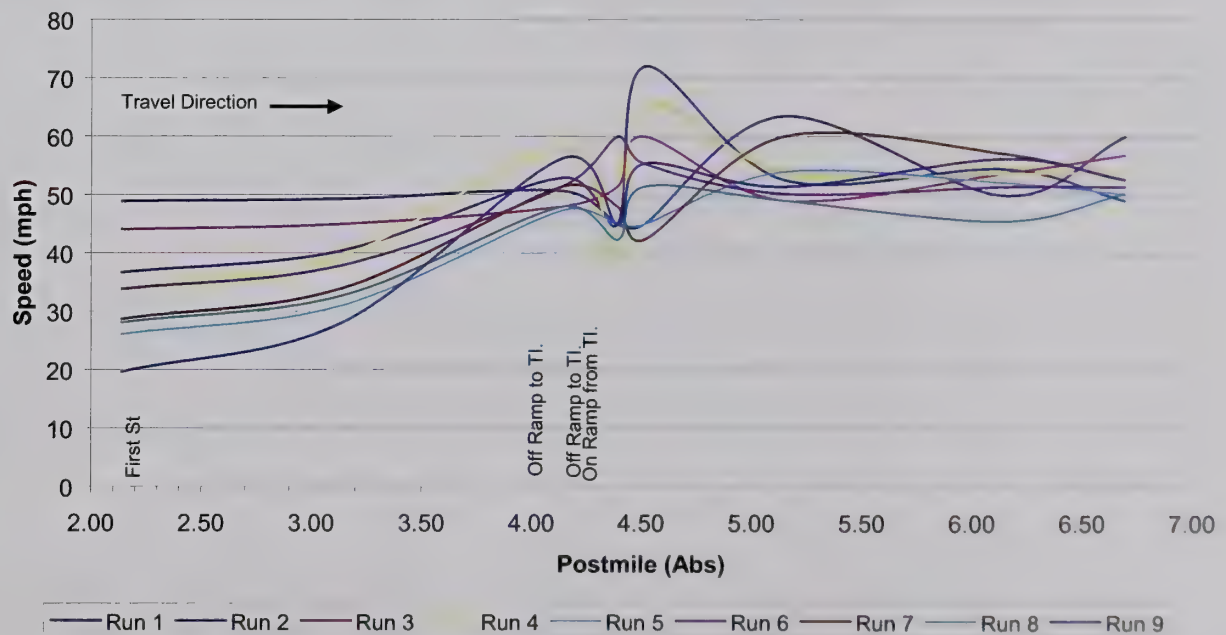
Heading westbound, the rightmost lanes 4 and 5 operate with slower speeds than leftmost lanes 1, 2, and 3 at the approaches to the Fremont Street off-ramp during the morning peak hours. The slower speeds of lanes 4 and 5 are caused by the queue of cars on the Fremont Street off-ramp, caused by the lack of capacity; which existed before the closure of the Harrison Street off-ramp. The slower speed operation typically begins at approximately mid-span. Occasionally, the slower speed traffic extends to the vicinity of the westbound on-ramp junction on the west side of the Bay Bridge. During other times, the retrofit construction activity further east, near 5<sup>th</sup> Street, causes traffic to slow down on the Bay Bridge.

## Peak Hour Travel Speed

### Westbound AM Peak Hour



### Eastbound PM Peak Hour



Note: The peak hour travel speed is the average speed between two observed locations.



## 2.2 2008 Existing Condition HCM Analysis

The analysis of traffic operations of the existing ramp configuration were completed using the methodologies described in the Highway Capacity Manual (HCM 2000). Ramp analysis was completed using methods from Chapter 25, Ramps and Ramp Junctions, of the HCM.

### Existing Traffic Volumes

The existing traffic conditions were evaluated by considering the highest ramp volume for each ramp within the peak periods of 7 AM – 9 AM for the morning peak hour and 4 PM – 6 PM for the evening peak hour. Existing ramp traffic volumes were collected for the Treasure Island Development Plan (TITP) EIR which was provided by Fehr & Peers Transportation Consultants. The ramp volumes were collected during week of May 4, 2008. At the time of the count, only one eastbound off-ramp and westbound on-ramp were available for use. The highest weekday ramp volumes were counted on Wednesday May 7, 2008 which is shown in Table 3 and graphically illustrated in Figure 2. The Bay Bridge mainline traffic volumes were obtained from the PeMS database for the same time period.

It should be noted, that Bay Bridge westbound traffic volumes are controlled by metering lights, during both the AM peak periods, and approximately half of the time during the PM peak periods. Although capacity of the Bay Bridge is 9,500 vehicles per hour (vph), it is Caltrans general practice to maintain acceptable operations on the Bay Bridge by limiting the traffic entering the bridge. This allowable traffic volume is determined by actual traffic volumes recorded at the monitoring station immediately west of the metering lights. Average weekday traffic volumes recorded at this monitoring station for the past three years (2006 – 2008) is approximately 8,600 vph in the morning.

### Existing Levels of Service

Traffic operating characteristics of intersections are described by the concept of Level of Service (LOS). LOS is a qualitative description of a ramp segment or intersection performance based on the criteria outlined in the *2000 Highway Capacity Manual*. LOS ranges from A, which indicates free flow or excellent conditions with short delays, to F, which indicates congested or overloaded conditions with extremely long delays. Caltrans criteria are used to establish a goal of LOS C, when possible. A project resulting in LOS E or F is considered to have a significant, adverse impact. LOS results for the Bay Bridge on- and off-ramps were determined from methods described in Chapter 25 of the *2000 Highway Capacity Manual* for ramps and ramp junctions. The travel density, LOS and average speed for each existing ramp junctions is shown in Table 2.

Figure 2 presents the volumes and ramp configuration and their associated capacities in the westbound and eastbound directions during both the morning and evening peak hours. The capacity of the existing westbound on-ramps is assumed to be 330 vph. This value was developed based on a combination of the highest volume measured and gap analysis, as documented in the *Disposal and Reuse of Naval Station Treasure Island, Administrative Final Environmental Impact Statement, September 2002*. The capacity of the mainline was assumed to be 1900 vphpl (vehicles per hour per lane) based on measured data and methods for field conditions adjustments outlined in the *HCM 2000, Chapter 22, Basic Freeway Segments*. The



capacity of the existing eastbound off-ramps are assumed to be 1800 vph in accordance with *HCM 2000, chapter 25, Ramps and Ramp junctions, exhibit 25-3 Approximate Capacity of Ramp Roadways*. The capacity of the proposed diagonal on- and off-ramps was also assumed to be 1500 vph and 1800 vph, respectively, based on free-flow speed. The capacity of the proposed loop on-ramp is assumed to be 1200 vph based on free-flow speed.

**Table 2 – Existing Ramp Junction Analysis**

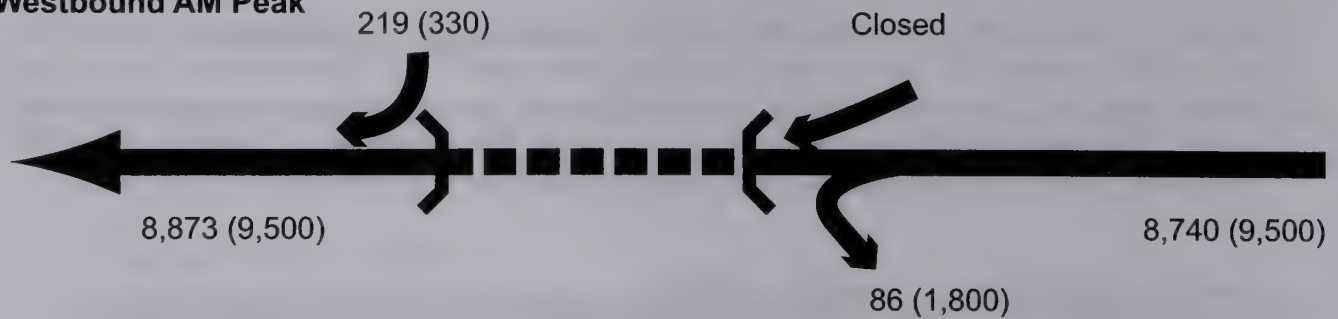
	Existing AM			Existing PM		
	LOS	Density	Speed	LOS	Density	Speed
<b>Westbound</b>						
Off-Ramp to TI (L)	D	28	65	C	25	65
On-Ramp from TI	D	31	56	D	27	59
On-Ramp from TI	D	31	58	D	28	61
<b>Eastbound</b>						
Off-Ramp to TI (L)	C	25	65	D	31	65
Off-Ramp to TI	C	25	62	D	30	59
On-Ramp from TI	D	27	61	D	34	56

Note:

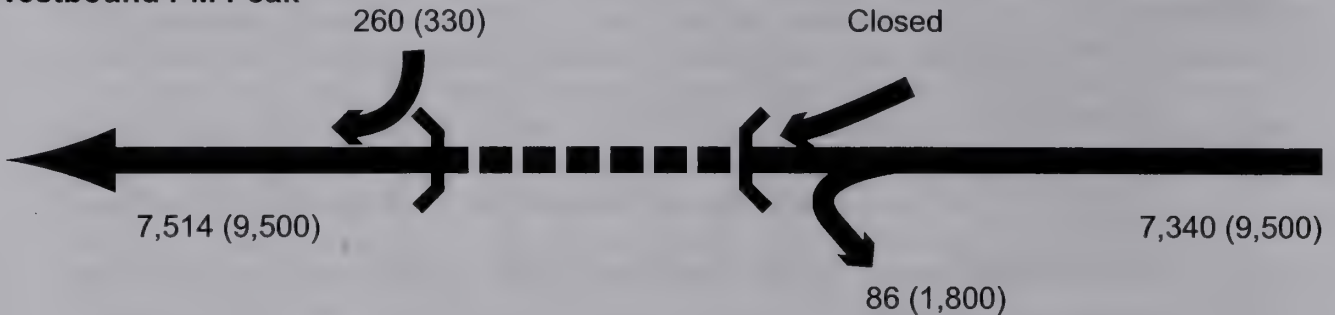
1. TI represents Treasure Island.
2. (L) represents the ramp is on the left-hand side of the freeway.
3. LOS calculation are from the HCM analysis

## Existing (2008) Peak-Hour Volume

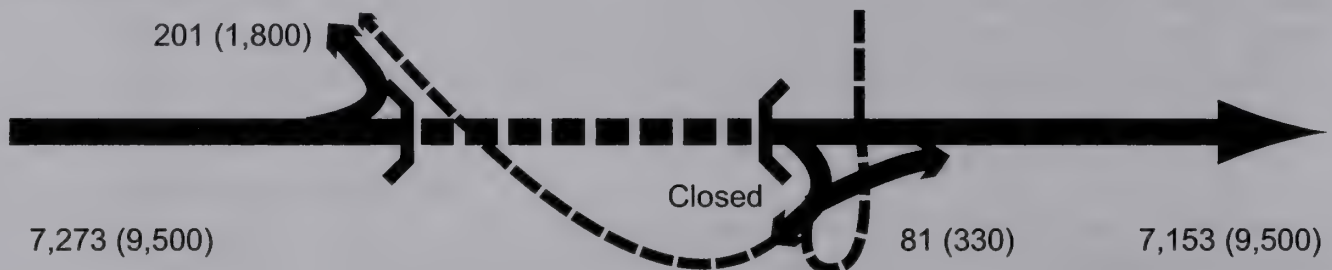
### Westbound AM Peak



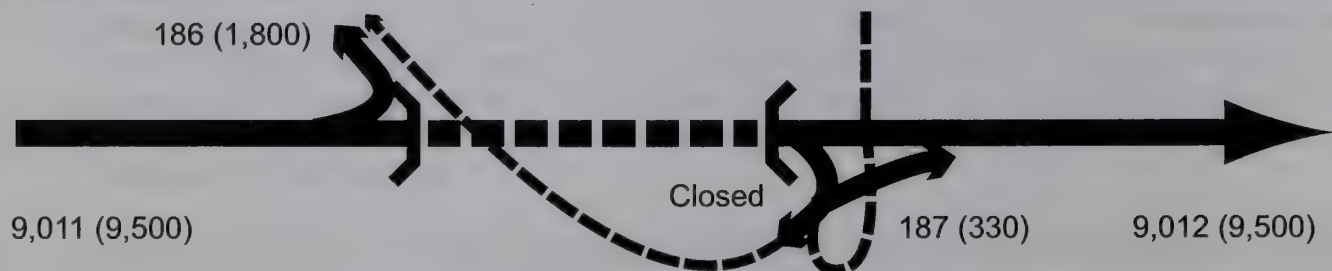
### Westbound PM Peak



### Eastbound AM Peak



### Eastbound PM Peak



1. The volume and capacity are shown as xx (yy).
2. Bay Bridge westbound traffic volumes are controlled by metering lights during both the AM and PM peak periods, and Caltrans sets a limit of 9,600 vehicles per hour onto the Bay Bridge.
3. Bay Bridge eastbound capacity is constrained by the ramps and mainline configuration near First Street. The highest volume counted between 2005 and 2007 was approximately 9,500 vehicles per hour.



### 3.0 FUTURE 2035 CONDITION ANALYSIS

The future 2035 condition operation analysis considers the 20 year growth following the completion of the YBI Ramps project. The future traffic demand for the Bay Bridge was evaluated for the following scenarios:

- 2035 No Build Condition
- 2035 Build Condition
- 2035 Build Condition with Ramp Metering

Future traffic demand volumes for the Treasure Island project and the Bay Bridge were estimated using two different methods and then integrated to ensure consistency. Future demand volumes for the Treasure Island project were estimated based on the proposed land use program for the *Treasure Island and Yerba Buena Island Redevelopment Plan (TIYBIRP)* based on a full build-out of the Treasure Island baseline redevelopment project, but without its enhanced Travel Demand Management (TDM) measures or any of its proposed transit service improvements. The demand analysis also does not consider any of the constraining effects of the ramp metering. The redevelopment project proposes a number of TDM measures (including congestion pricing, residential transit subsidies, bicycle sharing, etc.) and a high level of transit service during peak hours, including:

- New ferry service to San Francisco every 10 minutes
- New bus service to Downtown Oakland every 7 minutes
- Maintenance of the existing bus service to the Transbay Terminal (Muni Route 108-Treasure Island) in San Francisco every 5 minutes
- New bus service to the San Francisco Civic Center area every 12 minutes

The level of transit supply and TDM measures are expected to result in a substantial shift from automobile transit to use of the new transit supply. However, funding and/or operating details for all of this service has not yet been resolved. Therefore, the transportation analysis for the Yerba Buena Island Ramps Project is based on a scenario with limited TDM measures (no congestion pricing, for example) and the following reduced transit service assumptions:

- New ferry service to San Francisco every 50 minutes
- New bus service to Downtown Oakland every 7 minutes
- Maintenance of the existing bus service to the Transbay Terminal (Muni Route 108-Treasure Island) in San Francisco every 15 minutes
- No new bus service to the San Francisco Civic Center area every 12 minutes

As a result, the Yerba Buena Island Ramps study is based on the assumption of a substantially reduced transit supply, from what is ultimately proposed by the full Treasure Island project with TDM measures. The analysis included in this study, represents a worst-case scenario in terms of peak hour vehicle trips, using the proposed ramps.

Future demand volumes for the Bay Bridge were based on the MTC's travel forecasting model for the morning peak hours and San Francisco County Transportation Authority's (SFCTA)



travel forecasting model for the evening peak hours. Two different travel demand models were used because the MTC model was not validated for the evening peak period. In the following sections, both forecasting methods and integration procedures for the future traffic demand, as well as future bay bridge volumes, are discussed. Also, the performance results of the base condition alternatives are described.

### 3.1 Future 2035 Traffic Volumes on the Bay Bridge

Future traffic volumes for the Bay Bridge mainline were estimated using the MTC's travel forecasting model (BAYCAST 2009 RTP) for the morning peak hours and using the SFCTA's travel forecasting model (Champ 3.2) for the evening peak hours. Table 3 summarizes existing mainline volumes as well as future demand for year 2035. These results were documented and approved in the traffic forecasting report dated December 2008. It was estimated that approximately 18% of total traffic will be High Occupancy Vehicles (HOV).

**Table 3 – Approach Existing and Future Traffic Volumes**

	Existing (2008)	No Build
		Future Volumes (2035)
<i>Eastbound (SF approach)</i>		
AM Demand	8,557	8,769
AM Volumes	7,273	8,769
PM Demand	10,402	12,002
PM Volumes	9,011	9,500
<i>Westbound (East Bay approach)</i>		
AM Demand	12,652	16,385
AM Volumes	8,740	9,500
PM Demand	9,087	10,462
PM Volumes	7,340	9,500

Note:

1. AM peak hour demands were based on the MTC model and PM peak hour demands were based on the SFCTA's model.
2. 2008 volumes are 85 percentile volumes obtained from the PeMS database.

### 3.2 Future 2035 Condition Analysis

The 2035 No Build Condition consists of future 2035 traffic volumes with the TI/YBI development project, existing ramp configurations and their respective capacities. Figure 3 illustrates the future 2035 peak hour traffic demand volumes, in both directions of travel, ramp configurations, and capacities. During the morning peak hour period, the Bay Bridge mainline demand volumes will reach 10,054 and 8,769 vehicles per hour in the westbound and eastbound directions, respectively. The evening peak hour mainline demand volumes are expected to reach 10,030 and 9,750 vehicles per hour in the westbound and eastbound directions, respectively. However, these demand volumes will be constrained to 9,500 vph in both directions.

Table 4 summarizes results of the future No Build ramp junction analysis. The No Build condition yields a lower LOS as compared to the existing condition. In addition, the No Build condition will yield lower average speeds ranging from 38 mph – 50 mph as compared to 56 mph – 65 mph in the

existing condition. The capacity for both westbound on-ramps are 330 vph for this scenario. Since the demand volumes exceed this capacity, delays and queues will be expected on the island.

**Table 4 – 2035 Future No Build Ramp Junction Analysis**

	Future 2035 No Build AM			Future 2035 No Build PM		
	LOS	Density	Speed	LOS	Density	Speed
<b>Westbound</b>						
Off-Ramp to TI	F	49	40	F	47	47
On-Ramp to TI	F	49	38	F	48	45
On-Ramp from TI	E	41	45	E	41	47
<b>Eastbound</b>						
Off-Ramp to TI (L)	D	34	50	E	37	50
Off-Ramp to TI	D	33	49	D	33	48
On-Ramp from TI	E	40	48	E	40	48

Note:

1. TI represents Treasure Island.
2. (L) represents the ramp is on the left-hand side of the freeway.
3. Assumes no ramp metering

The 2035 Build Condition assuming no constraints (ramp metering) consists of the same 2035 traffic volumes used in the No Build scenario. The westbound off-ramp on the left side is replaced with an off-ramp on the right side and the on-ramp east of tunnel is modified to improve the geometry. Figure 4 illustrates the future 2035 Build condition peak hour traffic demand volumes, in both directions of travel, ramp configurations, and capacities. In addition to modifications of the ramps east of the tunnel, the westbound on-ramp west of tunnel will be reserved exclusively for buses and emergency vehicles. The existing configuration of the off-ramps in the eastbound direction will remain unchanged. Table 5 summarizes results the 2035 Build condition for the ramp junctions. Compared to the No Build condition, average operating speeds on the SFOBB are lower for the Build condition. This is due to the increased capacity of the new on-ramp on the east side compared to the old, 1200 vph versus 330 vph. Most of the westbound on-ramp traffic is allowed to enter the mainline unimpeded. Subsequently, there is no on-ramp queuing for this scenario.

**Table 5 – Future 2035 Build Ramp Junction Analysis**

	Future 2035 Build AM			Future 2035 Build PM		
	LOS	Density	Speed	LOS	Density	Speed
<b>Westbound</b>						
Off-Ramp to TI (R)	F	53	36	F	49	46
On-Ramp from TI	F	45	42	E	45	47
On-Ramp from TI	E	40	47	E	40	47
<b>Eastbound</b>						
Off-Ramp	D	34	50	E	37	50
Off-Ramp to TI	D	33	49	D	33	48
On-Ramp from TI	E	40	49	E	40	49

Note:

1. TI represents Treasure Island.
2. (L) represents the ramp is on the left-hand side of the freeway.
3. Assumes no ramp metering

### **3.3 Ramp Metering**

Caltrans will require ramp metering for the westbound on-ramp on the east side of the island. Based on extensive coordination and discussions with Caltrans staff, it was determined that the methodology used to set the metering rate for the westbound on ramp will be based on the amount of traffic exiting the Bay Bridge mainline at the off-ramp. Therefore, for the purpose of this study, the westbound on-ramp metering rate should be approximately 323 vph and 578 vph in the AM and PM peak periods, respectively. It was also noted that ultimately, Caltrans Bay Bridge Operations will use a combination of mainline and ramp metering rates. In other words, there might be times when Caltrans deemed appropriate to lower the allowable limit entering the mainline to increase the metering rate of the ramps, and vice-versa. Under the 2035 Build Condition with ramp metering, long delays and queues will be expected on the island.

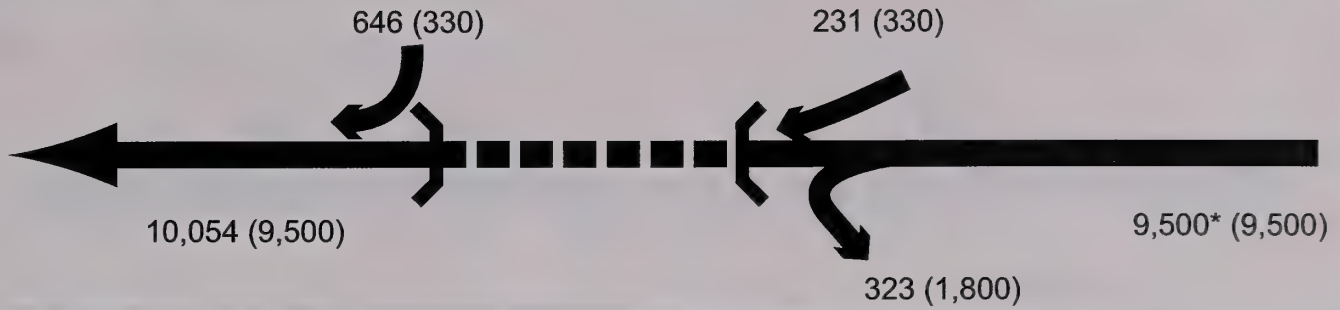
### **4.0 CONCLUSION**

The main objective of this analysis is to evaluate the impact of the proposed westbound Yerba Buena Island ramps on the Bay Bridge in the design year. Based on the future 2035 traffic operational analysis of the Bay Bridge, it was determined that the YBI Ramps project with ramp metering will not adversely affect the operations of the Bay Bridge and the associated local road network on Treasure Island and Yerba Buena Island.

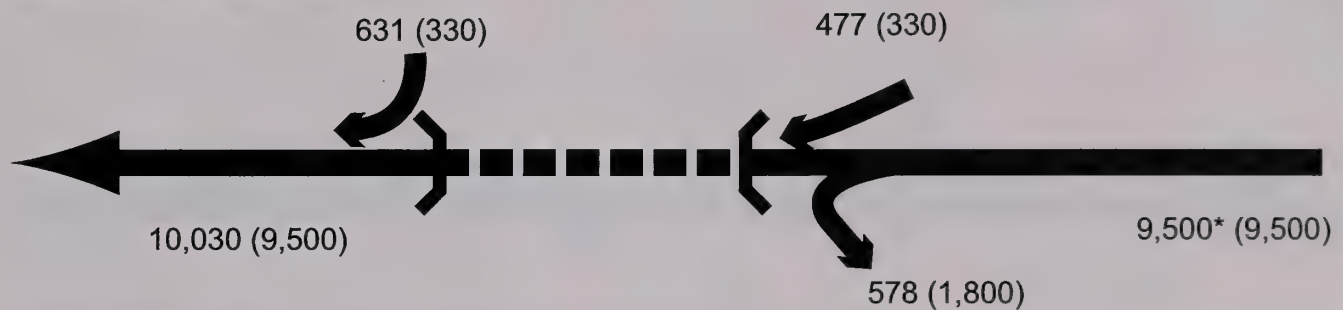


## Future (2035) No Build

### Westbound AM Peak-Hour



### Westbound PM Peak-Hour



### Eastbound AM Peak-Hour



### Eastbound PM Peak-Hour



1. The demand volume and capacity are shown as xx (yy).

2. In future scenario, there would be 4 bus trips to San Francisco and 9 bus trips from Oakland.

\* Constrained Volumes



## Future (2035) Build

### Westbound AM Peak-Hour



### Westbound PM Peak-Hour



### Eastbound AM Peak-Hour



### Eastbound PM Peak-Hour



1. The demand volume and capacity are shown as xx (yy).

2. In future scenario, there would be 4 bus trips to San Francisco and 9 bus trips from Oakland.

\* Constrained Volumes



**APPENDIX I**

**VISUAL IMPACT ASSESSMENT**







# **VISUAL IMPACT ASSESSMENT**

## **Yerba Buena Island Ramps Improvement Project**

District 04-SF-80  
KP 12.3/13.2  
EA 04-3A640

Caltrans District 4  
Landscape Architecture

December 17, 2009

**Visual Impact Assessment**  
**Yerba Buena Island Ramps Improvement Project**

**December 17, 2009**

District 04-SF-80  
KP 12.3/13.2  
EA 04-3A640

**Caltrans District 4**

**Landscape Architecture**



## TABLE OF CONTENTS

I.	PURPOSE OF VISUAL IMPACT ASSESSMENT.....	1
II.	PROJECT DESCRIPTION .....	1
III.	ASSESSMENT METHOD.....	7
IV.	VISUAL ENVIRONMENT OF THE PROJECT.....	7
	A. Project Setting .....	7
	B. Project Viewshed .....	8
	C. Landscape Units.....	8
V.	EXISTING VISUAL RESOURCES AND VIEWER RESPONSE.....	9
	A. FHWA Method of Visual Resource Analysis.....	9
	B. Existing Visual Resources .....	9
	C. Methods of Predicting Viewer Response.....	12
	D. Existing Viewer Groups, Viewer Exposure, and Viewer Awareness .....	13
VI.	VISUAL IMPACT ASSESSMENT.....	13
	A. Method of Assessing Project Impacts .....	13
	B. Visual Impact Types and Assessment Criteria .....	14
	C. Analysis of Key Viewpoints .....	17
	D. Consistency with Local Plans and Policies .....	71
	E. Summary of Project Impacts .....	73
	F. Cumulative Impacts.....	74
VII.	VISUAL MITIGATION .....	74
VIII.	REFERENCES .....	76

## TABLES

Table 1: Project Consistency with Local Plans & Policies.....	71
Table 2: Summary of Project Impacts – Alternative 2B .....	74
Table 3: Summary of Project Impacts – Alternative 4.....	74

## FIGURES

Figure 1: Project Location Map .....	2
Figure 2: Alternative 2B Ramps Alignment .....	4
Figure 3: Alternative 4 Ramps Alignment.....	6
Figure 4: Yerba Buena Island Image Types .....	11
Figure 5: Key Viewpoint Locations Map .....	18
Figure 6: Alternative 2B, Key Viewpoint 1: Macalla Rd. at North Gate Rd. Intersection.....	21
Figure 7: Alternative 2B, Key Viewpoint 3: Nimitz House.....	25
Figure 8: Alternative 2B, Key Viewpoint 3: Officers Quarters Open Space .....	27
Figure 9: Alternative 2B, Key Viewpoint 4: North Gate Road Staging Area .....	31
Figure 10: Alternative 2B, Key Viewpoint 5: Treasure Island.....	33
Figure 11: Alternative 2B, Key Viewpoint 6: Eastern YBI Waterborne Approach .....	37

**TABLE OF CONTENTS - *continued***

**FIGURES - *continued***

Figure 12: Alternative 2B, Key Viewpoint 7: Oakland Touchdown .....	39
Figure 13: Alternative 2B, Key Viewpoint 8: SFOBB Transition Structure .....	43
Figure 14: Alternative 4, Key Viewpoint 1: Macalla Rd. at North Gate Rd. Intersection .....	47
Figure 15: Alternative 4, Key Viewpoint 2: Nimitz House.....	49
Figure 16: Alternative 4, Key Viewpoint 3: Officers Quarters Open Space .....	53
Figure 17: Alternative 4, Key Viewpoint 4: North Gate Road Staging Area .....	57
Figure 18: Alternative 4, Key Viewpoint 5: Treasure Island .....	59
Figure 19: Alternative 4, Key Viewpoint 6: Eastern YBI Waterborne Approach.....	63
Figure 20: Alternative 4, Key Viewpoint 7: Oakland Touchdown.....	67
Figure 21: Alternative 4, Key Viewpoint 8: SFOBB Transition Structure .....	69

## **I. PURPOSE OF VISUAL IMPACT ASSESSMENT**

The purpose of this Visual Impact Assessment (VIA) is to assess the visual impacts of the proposed project and to propose measures to mitigate any adverse visual impacts associated with the construction of the proposed Yerba Buena Island (YBI) Ramps Improvement Project on the surrounding visual environment. The location of the project site is shown in **Figure 1**.

## **II. PROJECT DESCRIPTION**

YBI is located in the San Francisco Bay approximately halfway between Oakland and San Francisco. YBI is only accessible to vehicular traffic via the San Francisco Oakland Bay Bridge (SFOBB) stretch of Interstate 80 (I-80). The SFOBB is considered a “lifeline structure” and is a critical link between the East Bay and San Francisco. It provides the only vehicle access to YBI, the active U.S. Coast Guard (USCG) facilities located on the south side of the island, and Treasure Island, located immediately north of YBI.

The proposed project would replace the existing westbound on- and off-ramps located on the east side of YBI with new westbound on- and off-ramps. The new ramps would maintain the functional role of the current ramps while satisfying seismic requirements, highway design standards, traffic operations, and improve safety. The YBI Ramps Improvement Project is independent of both the SFOBB East Span Seismic Safety Project (SFOBB East Span Project), currently under construction, and the Treasure Island and Yerba Buena Island (TI/YBI) Redevelopment Plan, currently undergoing its own environmental review process.

The purpose of the project is to improve the safety of the westbound on- and off-ramps to the extent physically and economically feasible. The current ramps do not meet current Caltrans design standards. The proposed project would provide standard deceleration length for the off-ramp and improved acceleration/merging length for the on-ramp. In addition, the project would improve traffic operations to and from YBI.

Alternatives have been proposed to address the geometric deficiencies of the existing on- and off-ramps. The project site is located between post-mile (PM) 7.6 and 8.1<sup>1</sup> beginning at the east portal of the YBI tunnel and ending at the east side of the Transition Structure portion of the new SFOBB. The SFOBB Transition Structure is located between PM 7.9 and 8.1 between the YBI tunnel and the SFOBB Self-Anchored Suspension (SAS) span. The SFOBB Transition Structure is the name of a section of the new Bay Bridge. The Transition Structure will connect the SAS span to Yerba Buena Island, and will transition the East Span’s side-by-side road decks to the upper and lower decks of the YBI tunnel and West Span.

Three alternatives are currently under consideration,<sup>2</sup> including:

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<sup>1</sup> Kilometer Post (KP) 12.3 and 13.2

<sup>2</sup> A Conceptual Feasibility Report for the YBI interchange was prepared by Caltrans in 2002. The project development team and Caltrans, utilizing preliminary Caltrans geometrics, developed eight build alternatives and one no-build alternative. Various stakeholders were invited to several meetings to provide input on the design alternatives. The alternatives were discussed in detail, along with any non-standard design features. A selection process concluded that six build alternatives were nonviable, while Alternative 2B and Alternative 4 were viable.



**Figure 1:  
Regional Location**

**Yerba Buena Island  
Ramps Improvement Project**



Source: ESRI, USGS, DMJM Harris, EDAA

### No Build Alternative

This Alternative assumes that the existing on- and off-ramps would remain in place and no further action or improvements would occur. Given that existing conditions would remain in place, the No Build Alternative will not be evaluated in this VIA.

### Alternative 2B

The Alternative 2B design, shown in **Figure 2**, would include removal of the existing westbound on- and off-ramps on the east side of YBI, construction of a westbound loop on-ramp from Macalla Road on the east side of YBI, and construction of a westbound off-ramp to Macalla Road on the east side of YBI.

This alternative proposes to reconstruct two of the existing six on- and off-ramps at the I-80/YBI interchange. The proposed on- and off-ramps would provide standard 8-foot shoulder widths, and would include the following features:

- Westbound on-ramp on the east side of YBI- This ramp would begin at a “T” intersection at Macalla Road, loop south with a tight radius, and merge on to the north side of the Bay Bridge. The length of this ramp would be approximately 876 feet (267 meters). This ramp would have two traffic lanes, merging into one as it connects to the SFOBB. One lane would be a high occupancy vehicle (HOV) lane<sup>3</sup> and the other a mixed-flow<sup>4</sup> lane.
- Westbound off-ramp on the east side of YBI - This ramp would diverge from the new SFOBB Transition Structure between bents W3 and W4 curving around the Nimitz House and terminate at a “T” intersection at Macalla Road. The length of this ramp would be approximately 1,115 feet (340 meters). A stop sign is proposed at the ramp terminus at Macalla Road.
- Macalla Road would be widened for approximately 660 feet adjacent to the terminus of the westbound on- and off-ramps. The existing roadway is about 20 feet wide near the ramp terminus. The roadway widening is required to accommodate a 12-foot wide multi-use pedestrian/bike path and two 12-foot wide lanes within the Caltrans right-of-way. A retaining wall would be constructed adjacent to Macalla Road to provide the required width. The height of the retaining wall would vary from 4 to 16 feet and would retain the hillside above Macalla Road. The stairway adjacent to the Caltrans Substation would be relocated to the west side of the building to make room for the new retaining wall. The roadway width would vary around the curve at South Gate Road to provide proper width for truck turning movements.

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<sup>3</sup> Under the Treasure Island Transportation Management Act (Assembly Bill 981, signed into law in September 2008), high occupancy vehicles would be able to exit or enter Treasure Island free of charge.

<sup>4</sup> A mixed-flow lane is a general purpose travel lane with no traffic restrictions.



**Figure 2:**  
**Alternative 2b**



**Alternative 2b Proposed Ramps**

- Proposed West Bound Off-Ramp
- Proposed West Bound On-Ramp
- Proposed Macalla Road Improvements

**Separate Project Currently Under Construction**

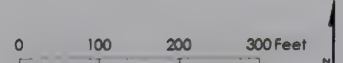
- San Francisco-Oakland Bay Bridge East Span Seismic Safety Project
- Transition Structure Portion of SFOBB

**Other Features**

- Bent
- Column

7/09

Image: Nima/USGS 2004  
Data: DMJM-Harris, EDAW





Yerba Buena Island Ramps Improvement Project  
Visual Impact Assessment

- Under Alternative 2B, the westbound on- and off-ramps would terminate at Macalla Road where Quarters 10 and Building 267 are currently located.<sup>5</sup> Quarters 10 and Building 267 would be relocated prior to construction of the ramps at Macalla Road. The relocation site for these buildings would be on YBI and would be determined under the Section 106 mitigation development process.

#### Alternative 4

The Alternative 4 design, shown in **Figure 3**, would include the removal of the existing westbound on- and off-ramps on the east side of YBI, construction of westbound on-ramp from South Gate Road, and construction of westbound off-ramp to Macalla Road on the east side of YBI.

This alternative proposes to reconstruct two of the existing six on- and off-ramps at the I-80/YBI interchange. The proposed on- and off-ramps would provide standard 8-foot shoulder widths, and would include the following features:

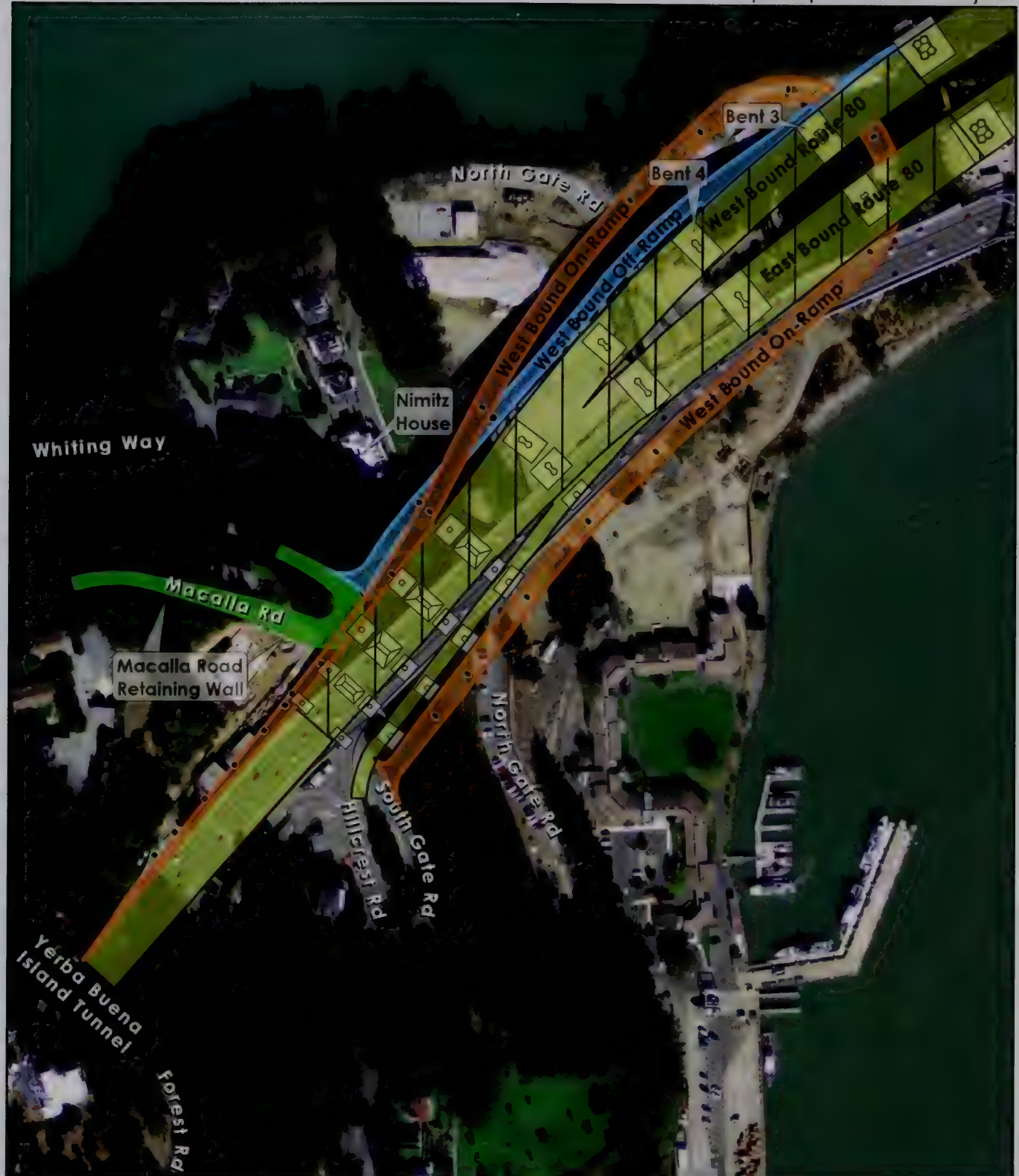
- Westbound on-ramp on the east side of YBI - This ramp would begin at South Gate Road, proceed east paralleling the eastbound on-ramp, loop under the new SFOBB Transition Structure near its eastern end to provide adequate merging distances, cross over the westbound off-ramp along the north side of the Bay Bridge. The length of this ramp would be approximately 2,883 feet (879 meters). HOV lane would not be provided under Alternative 4.
- Westbound off-ramp on the east side of YBI - This ramp would diverge from the new SFOBB Transition Structure between bents W2 and W3, parallel the Transition Structure, cross under the westbound on-ramp and terminate at a "T" intersection at Macalla Road. The length of this ramp would be approximately 1,168 feet (356 meters). A stop sign is proposed at the ramp terminus at Macalla Road.
- Macalla Road would be widened for approximately 660 feet adjacent to the terminus of the westbound on- and off-ramps. The existing roadway is about 20 feet wide near the ramp terminus. The roadway widening is required to accommodate a 12-foot wide multi-use pedestrian/bike path and two 12-foot wide lanes within the Caltrans right-of-way. A retaining wall would be constructed adjacent to Macalla Road to provide the required width. The height of the retaining wall would vary from 4 to 16 feet and would retain the hillside above Macalla Road. The roadway width would vary around the curve at South Gate Road to provide proper width for truck turning movements.

Under Alternative 4, Quarters 10 and Building 267 and its associated landscaping would remain in place.

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<sup>5</sup> Quarters 10 and Building 267 (a contributing garage) are listed in the National Register of Historic Places and are significant at the local level under Criterion C, as a significant example of mid-twentieth century residential architecture.

**Figure 3:  
Alternative 4**



**Alternative 4 Proposed Ramps**

- Proposed West Bound Off-Ramp
- Proposed West Bound On-Ramp
- Proposed Macalla Road Improvements

**Separate Project Currently Under Construction**

- San Francisco-Oakland Bay Bridge East Span Seismic Safety Project
- Transition Structure Portion of SFOBB

**Other Features**

- ◆ Bent
- Column



### III. ASSESSMENT METHOD

The process used in this visual impact study generally follows the guidelines outlined in the publication "Visual Impact Assessment for Highway Projects", Federal Highway Administration (FHWA), March 1981.

Six steps required to assess visual impacts were performed. They are as follows:

- A. Define the project setting and viewshed.
- B. Identify key viewpoints for visual assessment.
- C. Analyze existing visual resources and viewer response.
- D. Depict the visual appearance of project alternatives.
- E. Assess the visual impacts of project alternatives.
- F. Propose methods to mitigate adverse visual impacts.

### IV. VISUAL ENVIRONMENT OF THE PROJECT

#### A. Project Setting

The regional landscape establishes the general visual environment of the project, but the specific visual environment upon which this assessment will focus is determined by defining landscape units and the project viewshed.

The San Francisco Bay Area extends over sixty miles from the Sacramento River Delta in Benicia to the marshlands of Santa Clara County, a total of more than 1,000 square kilometers (386 square miles). The Bay is a rich marine resource providing navigable waterways for commerce, and habitat for countless wildlife species. The Bay Area combines water, islands, skylines, bridges, and mountains into vistas both picturesque and impressive. Seven different bridges span the Bay, each one constituting a significant visual resource in its own right. The Golden Gate Bridge is known around the world for its grace and beauty. However, all seven bridges span significant stretches of open water and are highly visible from vantage points around the Bay.

Roughly mid-way between the northern and southern ends of the Bay, the Cities of Oakland and San Francisco are located across the Bay from one another. For viewers both on and off the water, the area between these two cities is particularly scenic. Four major islands (Alcatraz, Angel, Treasure, and Yerba Buena) are found in this region, while Mt. Tamalpais and the hills of Marin County tower to the west. The skylines of Oakland and San Francisco provide a vivid and unique visual image. Preservation of this region's aesthetic quality is of particular importance to the millions of people who live in and visit the Bay Area each year.

YBI is a 147 acre natural island that sits in San Francisco Bay between San Francisco and Oakland. The island's high point is located 338 feet above mean sea level, and large portions of it are undeveloped, with steep wooded hillsides leading down to the shoreline.

A large amount of the island's surface area is covered with thick vegetation consisting mostly of stands of large, mature eucalyptus trees, smaller ornamental landscape trees, shrubs and lawn areas. Developed areas of the island are scattered throughout, almost "embedded" within its less developed areas. Consequently, when a person is located in a developed area of YBI, it appears that



## Yerba Buena Island Ramps Improvement Project Visual Impact Assessment

much of the surrounding area is undeveloped, though other buildings and/or roads are located nearby but views to these visual elements are obstructed by existing thick vegetation.

However, the eastern fringe of the island, where the USCG installation is located, is mostly flat and open with less vegetation cover. The USCG buildings, mostly small one and two story structures, are clustered in groups along the eastern shore of the island. This part of the island, more so than the western side of YBI, is visually dominated by the western terminus of the SFOBB East Span. Users of the island situated in this area are able to see the elevated roadway superstructure of the western terminus in almost any direction they look.

### **B. Project Viewshed**

A viewshed is a subset of a landscape unit and is comprised of all the surface areas visible from an observer's viewpoint. The limits of a viewshed are defined as the visual limits of the views located from the proposed project. The viewshed also includes the locations of viewers likely to be affected by visual changes brought about by project features.

Due to the location of YBI at the geographical center of the Bay Area, the project's conceptual viewshed is vast. The project area is visible from many Bay Area locations at sea level, and from locations at higher elevations. Similarly, YBI offers vast and often unobstructed view opportunities of large parts of the Bay Area. For practical purposes, this VIA focuses on three primary viewing distance viewshed zones; immediate, moderate and long distance. These distance zones are subsets of the larger conceptual project viewshed.

The immediate distance viewshed zone encompasses the project site and the area of YBI immediately around it. This area offers close views of the SFOBB and the YBI ramps, as well as isolated views to the Bay. From the moderate distance viewshed zone, which extends up to one half mile away from YBI, the project area is still visible though less well defined. The island's vegetation begins to obscure some project features and the island as a whole appears as a singular, intact landmass. From the long distance viewshed zone, which extends up to two miles away to the Oakland Touchdown area, project site features are not clearly defined. Sightlines to the various viewsheds from the project site are for the most part unobstructed.

### **C. Landscape Units**

A landscape unit is a portion of the regional landscape and can be thought of as an outdoor room that exhibits a distinct visual character. A landscape unit will often correspond to a place or district that is commonly known among local viewers. The following three landscape units have been identified for the project site and its vicinity:

**Northeast Yerba Buena Island Landscape Unit.** The SFOBB touches down on the northeastern tip of YBI. This location is visually distinct from other parts of the island, due to the bridge structure's dominating effect on views toward the area as well as on views from the area. The area's topography is mostly flat relative to the rest of the island, and is also less vegetated. Current SFOBB East Span project construction activity and construction staging areas associated with that project have affected the area's visual character, in that views of construction materials and equipment are common in this part of the island. Views visible from this landscape unit include Bay waters, Treasure Island and the East Bay.

**Greater Yerba Buena Island Landscape Unit.** This landscape unit is visually distinct from the Northeast Yerba Buena Island landscape unit. Though from some locations the SFOBB has a strong visual presence, it is less dominant when compared to its effect in the northeastern part of the island. This area is vegetated predominantly with mature eucalyptus trees that grow across the island's hilly landform. Views visible from this landscape unit are expansive and include Bay waters, Treasure Island, the East Bay, South Bay, San Francisco and Marin.

**Bay Water/Shoreline Landscape Unit.** This landscape unit encompasses Bay waters near YBI, as well as the shorelines of Treasure Island and the Oakland Touchdown area, from which views of YBI are proximate and clear. The visual character of this area is influenced by the expanse of Bay waters that is visible from many vantage points, as well as by the shorelines of nearby land masses.

## **V. EXISTING VISUAL RESOURCES AND VIEWER RESPONSE**

### **A. FHWA Method of Visual Resource Analysis**

**Identify Visual Character** – Visual character is descriptive and non-evaluative, which means it is based on defined attributes that are neither positive nor negative. A change in visual character cannot be described as having positive or negative attributes until it is compared with the viewer response to that change. If there is public preference for the established visual character of a regional landscape and resistance to a project that would contrast with that character, then changes in the visual character can be evaluated.

**Assess Visual Quality** – Visual quality is evaluated by identifying the vividness, intactness and unity present in the viewshed. The FHWA states that this method should correlate with public judgments of visual quality well enough to predict those judgments. This approach is particularly useful in highway planning because it does not presume that a highway project is necessarily an eyesore. This approach to evaluating visual quality can also help identify specific methods for mitigating each adverse impact that may occur as a result of a project. The three criteria for evaluating visual quality can be defined as follows:

**Vividness** is the visual power or memorability of landscape components as they combine in distinctive visual patterns.

**Intactness** is the visual integrity of the natural and man-built landscape and its freedom from encroaching elements. It can be present in well-kept urban and rural landscapes, as well as in natural settings.

**Unity** is the visual coherence and compositional harmony of the landscape considered as a whole. It frequently attests to the careful design of individual manmade components in the landscape.

### **B. Existing Visual Resources**

#### **1. Existing Visual Character**

The YBI landscape unit has a certain visual character based upon the land uses that comprise it. These smaller scale uses and distinct landforms within the landscape unit are called image types. These image types give the landscape unit its character. A cross section of image types found on

Yerba Buena Island Ramps Improvement Project  
Visual Impact Assessment

YBI is shown in photographs presented in **Figure 4**. The following four general image types can be identified on YBI:

**Residential**

Older Residential – Refers to various single family residential structures built on the island during the early to middle part of the 20<sup>th</sup> Century, and includes historically significant buildings.

High Density Residential – Refers to newer late 20<sup>th</sup> Century residential buildings.

**Woodland/Open Space**

This image type refers to the many areas of the island covered in vegetation. Vegetation includes open lawns, ornamental shrubbery and ornamental trees, to large stands of mature eucalyptus and pine trees.

**Infrastructure**

This image type refers to bridge and surface road facilities on YBI.

**Institutional**

This image type refers to USCG property on YBI. Due to security concerns, no close range photographs of this property are shown, with the exception of one key viewpoint analyzed in this VIA.

Photos “A” and “B” and “C” in Figure 4 illustrate views of residential, woodland/open space and infrastructure image types. The photographs show older single family residential buildings initially used by the US Navy during the early part of the 20<sup>th</sup> Century. The buildings are situated along narrow roads, in an area where the undulating landform is covered by low shrubs, mature trees, lawn areas, and non-native stands of mature eucalyptus woodland.

Photo “D” in Figure 4 illustrates an example of the type of high density residential structures found on YBI, many of which were built during the 1960s and 1970s.

In terms of infrastructure, several of the photos in Figure 4 provide examples of infrastructure image types on YBI. Photos “D”, “E” and “F” illustrate the undulating landforms that exist on YBI, a landform that predominates on the island. Owing to this natural landform, roads often undulate and curve as they travel throughout the island, and much of the island’s developed areas conform to the island’s natural topography.



**Figure 4:**  
**Yerba Buena Island Image Types**

Yerba Buena Island  
Ramps Improvement Project



**A**



**B**



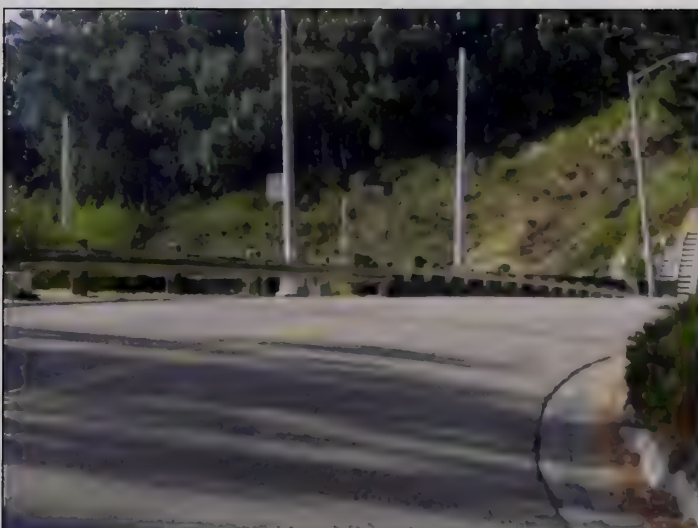
**C**



**D**



**E**



**F**

## 2. Existing Visual Quality

Existing visual quality on YBI is moderately high. The island is located in a natural setting that is very vivid when seen from a variety of vantage points. Simply due to being one of a few islands located on San Francisco Bay, YBI is a very vivid landform that is memorable to people that observe it from near and far. People viewing YBI as they approach the island from the East Bay, or from San Francisco while traveling on the SFOBB, will note the strikingly dense land cover found on the island, as well as how it visually interacts with the SFOBB. Other human made development on the island, such as the well preserved distinctive early 20<sup>th</sup> Century US Navy structures are quite memorable to island visitors. Viewers located on the San Francisco mainland and to a greater degree, viewers in the East Bay, see YBI in a less defined manner. It is more difficult for these distant viewers to discern the island's variations in topography, its varied vegetation types and developed areas that contain its residential and institutional buildings.

The overall visual intactness of YBI is moderate, given the effect the SFOBB has had on the island's natural state. In some areas of YBI, the bridge is quite omnipresent, and visually dominates other features on the island such as vegetated open spaces and human made development. Visual intactness of these areas is therefore considered low. From other locations on YBI, the bridge is not visible at all, since it is obstructed by hilly landforms and vegetation, lending these areas a higher degree of intactness. Though these areas may be developed with residential structures and/or infrastructure, these objects blend in with the natural environment to a greater degree than does the SFOBB. When viewed from a distance, or from areas of YBI that are at a higher elevation than the SFOBB, the visual intactness and unity of YBI is higher than when viewed from the island's lower elevations. From higher elevations, the island's landform interacts elegantly with surrounding Bay waters, and the SFOBB gracefully meets the YBI land mass. In views from the San Francisco mainland, YBI and the SFOBB together form an intact and unified image consisting of two large structures, one natural and one human made.

### C. Methods of Predicting Viewer Response

Viewer response is composed of two elements: viewer sensitivity and viewer exposure. These elements combine to form a method of predicting how the public might react to visual changes brought about by a highway project.

**Viewer sensitivity** is defined both as the viewers' concern for scenic quality and the viewers' response to change in the visual resources that make up the view. Local values and goals may confer visual significance on landscape components and areas that would otherwise appear unexceptional in a visual resource analysis. Even when the existing appearance of a project site is uninspiring, a community may still object to projects that fall short of its visual goals. Analysts can learn about these special resources and community aspirations for visual quality through citizen participation procedures, as well as from local publications and planning documents.

**Viewer exposure** is typically assessed by measuring the number of viewers exposed to the resource change, type of viewer activity, duration of their view, speed at which the viewer moves, and position of the viewer. High viewer exposure heightens the importance of early consideration of design, art, and architecture and their roles in managing the visual resource effects of a project.



#### **D. Existing Viewer Groups, Viewer Exposure, and Viewer Awareness**

##### **Freeway Travelers**

Approximately 275,000 vehicles that use the SFOBB each day pass through YBI.<sup>6</sup> A large portion of these vehicles contain commuters that are traveling between San Francisco and the East Bay. Daily commuters may have an increased awareness of views from the road due to their frequency of travel through YBI. Those that experience congested traffic conditions as they travel through YBI will tend to focus on views of the island itself. Drivers traveling at normal freeway speeds usually focus attention on long range non-peripheral views. This viewer group has a heightened awareness of a wide range of views.

##### **YBI Residents (including USCG personnel stationed on island)**

Upon decommissioning of the Naval base on YBI by the United States Navy in 1996, much of the housing stock on the island became occupied by civilian, rather than military residents. Currently, residents that live on YBI in housing of various types are located throughout the island. These residents use the existing YBI on-ramp and off-ramp infrastructure relatively frequently as they arrive at and leave the island, and therefore constitute an important viewer group. Some YBI residents also have views from their homes toward the YBI on-ramp and off-ramp infrastructure. USCG personnel are stationed on YBI for extended periods of time, and are therefore also an important viewer group.

##### **Recreational Users and Event Attendees**

Recreational opportunities abound around the Bay and many of them center upon either the use of the Bay or upon views of the Bay. Activities such as sailing, kayaking, windsurfing, and fishing make use of the Bay itself, while activities such as sightseeing, hiking, biking and walking often incorporate a view of the Bay. Recreationalists involved in these activities may at various times experience views of YBI and its features. The island is also host to events such as weddings, which bring visitors to YBI.

### **VI. VISUAL IMPACT ASSESSMENT**

#### **A. Method of Assessing Project Impacts**

The methodology used to assess visual impacts is also taken from the FHWA guidelines. The impact assessment process incorporates and combines the two principal visual impact components: visual resource change and viewer response to that change. Visual resource change is analyzed in terms of visual dominance and other specific visual effects of alternatives, together with change in visual quality. Viewer responses to these changes are interpreted on the basis of viewer types identified in this Assessment. Visual simulations were prepared to assist the analysis, using computer generated information overlaid on photographic images from actual site photos at six (6) selected viewpoints. Renderings were prepared for two (2) viewpoints wherein a “before” image differs from, or does

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<sup>6</sup> California Department of Transportation, Toll Bridge Seismic Retrofit Program Report: Finding and Recommendation for Completion of the Main Span of the San Francisco-Oakland Bay Bridge East Span Seismic Safety Project, p. iii, December 8, 2004.



Yerba Buena Island Ramps Improvement Project  
Visual Impact Assessment

not accurately reflect, the image that currently physically exists. In addition, the relationship of the project to applicable plans and policies is examined, and any inconsistencies between potential impacts and adopted policies are highlighted.

**B. Visual Impact Types and Assessment Criteria**

Visual impacts were categorized into general types, and separate criteria apply to each different visual impact type.

**Criteria Specific Effects on Viewers**

The criteria used to determine effects on viewers include: visual dominance of the project; view obstruction or view expansion; effects on community disruption; viewer orientation; and design quality issues, such as changes in vividness, intactness and unity.

**Visual Dominance**

Visual dominance refers to the contrast between the proposed improvements and their setting described in terms of vegetation, landform, and structural changes. Dominance is a function of how potentially noticeable the project is to the viewer, ranging from:

- In-evident: Project is visible but generally not noticeable.
- Subordinate: Project is noticeable, but attracts less attention than other components of the setting.
- Co-dominant: Project attracts attention equally with other components of the setting.
- Dominant: Project dominates the view and attracts more attention than other components of the setting.

Visual elements of scale, form, line, and position, as seen from representative sensitive viewing locations, determine the degree of contrast and dominance.

It is possible to determine the expected degree of visual dominance for the project from a given viewpoint. The determination involves an evaluation of the visibility and visual contrast of project components within their surroundings, together with viewing distance and degree of visual exposure for the viewer.

A visually dominant project represents a more substantial visual change if it occurs in areas such as an intact natural landscape. In general, if the project would cause the YBI ramps to change from a more dominant to a less dominant level, the effect is generally considered to be beneficial. Conversely, if the dominance of the ramps increases because of the project, the effect is generally considered to be adverse.

It is important to stress that visual dominance is only one of the criteria which may be considered in evaluating visual quality. The visual effect may be altered considerably by other criteria, including view obstruction/expansion; vividness; intactness; unity; and community disruption/privacy/orientation and loss or addition of attractive landscape features (e.g., trees).

### **View Obstruction or Expansion**

View obstruction or expansion is a criterion that may modify the degree of adverse effect expected from the dominance evaluation. In terms of view blockage, existing views may be eliminated as a result of structural or landform additions that may block visual access. Conversely, views may be improved or made newly available as a result of existing structural and landform elements being moved or removed. View obstruction or expansion is categorized as follows:

- Obstructed view: Project fully or largely blocks views of notable landscape features or vistas.
- Partial view obstruction: Project interrupts or partly screens views of notable landscape features or vistas, but some experience of viewing features or vistas remains.
- New or expanded view: Project opens up views of notable landscape features or vistas.

In this Assessment, notable landscape features may include either positive visual elements with high visual unity and intactness (views of the Bay, ridgelines, open space, historic landmark buildings) or negative ones with low unity and intactness (substations, construction sites and construction staging areas). Therefore, whether the effect on view obstruction is considered adverse or beneficial depends on the object being viewed. This criterion has been applied only where important views or viewing directions toward notable features are affected; it is not applied in situations where general or unspecified views may be blocked.

### **Community Disruption, Orientation and Privacy**

Considerations of community disruption, viewer orientation, and privacy represent a set of criteria, which reflects typical viewer responses and perceptions about the relationship of transportation corridors to the surrounding neighborhood.

**Community Disruption:** Changes in both physical and visual conditions can influence the degree of community disruption perceived by local residents because of a project. This report considers only the visual evidence of community disruption and not access or land-use effects. Changes that make the project more visible and more obstructive tend to increase perceived community disruption. This criterion applies mainly to views to the road from residential, recreational, and office commercial viewer groups.

**Orientation or “way-finding”:** Pertains to visual information (landmarks, signage, indicators of local character) along the freeway or other travel routes, which may cue travelers to their regional and local position, and which potentially improve a sense of direction or perceived safety. Orientation is evaluated as either being improved (when views to recognized landscape features are opened up, or viewing sequences along important entry routes become less confusing) or worsened (when continuous view blockage along travel routes prevent orientation to surrounding communities and natural features, or when a complicated travel path leads to frequent changes in view direction).

**Privacy:** An important consideration in residential neighborhoods where direct sight-lines from roadways to adjacent homes and gardens are perceived as adverse to the inhabitants.

Yerba Buena Island Ramps Improvement Project  
Visual Impact Assessment

**Overall Effects on Viewers**

An overall determination of adverse and beneficial effects on viewers is based on a combined evaluation of all the criteria described above. Impacts are categorized as:

An overall determination of adverse and beneficial effects on viewers is based on a combined evaluation of all the criteria described above. Impacts are categorized as:

- Strongly Beneficial: substantial visual change and considerable increase in the overall visual quality, with the likelihood of strongly positive viewer responses.
- Beneficial: moderate degrees of visual change and an increase in the overall visual quality, with the likelihood of positive viewer responses.
- Minimally Beneficial: tangible visual changes and a minimal increase in overall visual quality, with the likelihood of moderately positive viewer responses.
- Negligible: little or no visual change and no tangible reduction or increase in visual quality, without negative or positive viewer responses expected.
- Minimally adverse: a tangible degree of visual change and a minimal reduction in overall visual quality, with the likelihood of some moderately negative viewer responses.
- Adverse: moderate degrees of visual change and a reduction in the overall visual quality, with the likelihood of negative viewer responses.
- Strongly Adverse: substantial visual change and considerable reduction in the overall visual quality, with the likelihood of strongly negative viewer responses.

In the absence of a formal viewer response survey on reactions to predicted visual impacts, the evaluation of viewer responses is based on the following: general criteria of visual sensitivity derived from FHWA guidance; and past visual studies conducted by Caltrans.

Effects on viewers are further subdivided by viewer type, since different viewer groups may have different levels of sensitivity to visual issues. For the purposes of impact documentation, viewer types are classified as:

- Freeway travelers
- YBI residents (including USCG personnel)
- Recreational users (bicyclists, pedestrians, and boaters)

**Change in Visual Quality**

Change in visual quality addresses the effect of the project on overall visual quality at the landscape unit scale. This can be determined by reevaluation of the vividness, unity, and intactness criteria for the unit with the post-project condition, noting both specific changes and overall changes in visual character. This analysis reflects the cumulative effects of the project on views as documented for particular viewpoints and image types, as well as inherent changes in visual character regardless of specific existing viewpoints.



### **Conformance with Applicable Policies**

Policies governing aesthetics and related issues concerning the project study area have been reviewed in relation to the project description for conformance. Potential conflicts with these policies are described in the impact assessment.

### **C. Analysis of Key Viewpoints**

Because it is not feasible to analyze all the views in which the proposed project would be seen, it is necessary to select a number of key viewpoints that would most clearly display the visual effects of the project. Key viewpoints also represent the primary viewer groups that would potentially be affected by the project.

A total of eight key viewpoint locations were identified for analysis in this VIA. The viewpoints are identified in this document as the following:

1. Macalla Road at North Gate Road Intersection
2. Nimitz House
3. Officers Quarters Open Space
4. North Gate Road Staging Area
5. Treasure Island
6. Eastern YBI Waterborne Approach
7. SFOBB Oakland Touchdown
8. SFOBB Transition Structure

The VIA discusses two renderings prepared for the Alternative 2B design pertaining to Key Viewpoints 1 and 8, and a discussion of six photo-simulations prepared for the Alternative 2B design related to Key Viewpoints 2 through 7. This will be followed by a discussion of two renderings prepared for the Alternative 4 design pertaining to Key Viewpoints 1 and 8, and a discussion of six photo-simulations prepared for the Alternative 4 design related to Key Viewpoints 2 through 7. Key viewpoint locations are shown in **Figure 5**.

In addition to “before and after” images of the viewpoints that are illustrated through the use of photo-simulations, this VIA also illustrates where a hypothetical observer of each viewpoint would be located geographically relative to the YBI ramps. The VIA also helps the reader distinguish between structural elements associated with the YBI Ramps Improvement Project and elements of the separate SFOBB East Span Project. When evaluating the potential visual impacts of the proposed YBI ramps, it is important to recognize to what degree visual impacts in the project area would be caused by the YBI Ramps Improvement Project compared to impacts resulting from the separate SFOBB East Span project. This is done through the use of graphical insets that clearly distinguish what structures in each viewpoint are associated with the YBI Ramps Improvement Project and which are a part of the SFOBB East Span Project. In these insets, structures associated

**Figure 5:**  
**Key Viewpoint Locations**

Yerba Buena Island  
Ramps Improvement Project





## Yerba Buena Island Ramps Improvement Project Visual Impact Assessment

with the YBI Ramps Improvement Project appear in color (blue for Alternative 2B insets, orange for Alternative 4 insets), while the rest of the image is shown in black and white.

The photo-simulations and renderings presented for Alternative 2B illustrate ramp designs that incorporate ribbing on road deck undersides, while Alternative 4 photo-simulations and renderings present ramp designs without ribbing. A ribbed design is dramatically distinct from a non-ribbed design. Therefore, it is necessary to separately consider the visual effects of each design technique. To facilitate analysis of this design feature in an effective manner, the ribbed design technique is presented only for Alternative 2B, while the non-ribbed design technique is presented only for Alternative 4.

Rather than compare the visual effects of a ribbed design with a non-ribbed design for each alternative and each viewpoint, it is useful to discuss the effects of each technique on a more holistic scale that would apply to both alternatives and all viewpoints.

The rib design technique proposed for the YBI ramps involves installation of semi-rectangular shaped concrete elements on the lateral undersides of the road decks. Each rib would measure about 30 feet in length from the ramp's outside edge to near its center, and two feet wide when viewed in profile from below the ramp. The ribs would be spaced about 10 feet apart from each other.

The use of ribs in the ramp design is consistent with the architectural vocabulary of the new SFOBB East Span. Both the eastbound on-ramp at YBI and the bicycle/pedestrian facility utilize a rib design to support the structure. The exposed ribs indicate to viewers a change in scale and speed, and create visual interest. They give an added impression of depth, yet also make the ramp appear sinuous and lighter in weight.

### **Alternative 2B**

#### **Key Viewpoint 1 – Macalla at North Gate Intersection**

Analysis of this viewpoint is based on a rendering rather than a photo-simulation. Implementation of Alternative 2B would require removal of Quarters 10 (a US Navy residential structure) and Building 267 (a garage associated with Quarters 10), in order to provide right-of-way for the YBI ramps. Quarters 10 is not visible from this vantage point. Therefore, it would be inaccurate to present a “before” image of the vantage point when a structure that would be drastically affected by the project is not visible in the image. For this reason, a rendering was chosen as a means to illustrate the visual effect of the ramps at the intersection of Macalla Road and North Gate Road.

#### ***Orientation***

This key viewpoint is toward the northeast from the intersection of Macalla Road and North Gate Drive. **Figure 6** depicts a rendering of Alternative 2B. In order to provide site context, the figure also presents photos of Quarters 10 and Building 267.

#### ***Landscape Unit***

Greater YBI landscape unit.

#### ***Viewer Groups***

This viewpoint represents a typical view experienced by YBI residents.



***Existing Visual Quality/Character***

This area of the island is dominated by the presence of the double deck structure of the SFOBB East Span as it nears the YBI tunnel. The view presented in this viewpoint is a vivid microcosm of the island itself, in that on YBI there is often an inter-play between the natural environment and the SFOBB. In this view, the bridge's intactness and unity are relatively low, due to the large scale and omnipresence of the road decks when viewed from such close proximity. Overall unity and intactness of the view is low when all of its elements are taken together. The substation on the left side of the view, Building 267, the mature vegetation and the road decks present a cluttered image in which natural features and human made features do not visually complement each other.

***Proposed Project Features***

Implementation of Alternative 2B would require the removal of some vegetation currently visible in the view (in the area immediately right of Building 267), in order to provide right-of-way for the ramps. A viewer at this location would see the on-ramp overhead as it descends toward Macalla Road.

***Change to Visual Quality/Character***

Visual Dominance: Though the ramps would be somewhat obstructed by existing foreground vegetation, it nevertheless would be the dominant visual feature of this viewpoint. From this vantage point, the ramps' massing would be visible immediately overhead as well as in the distance as they loop across the viewer's line of sight, though portions would be obscured by existing vegetation and the existing substation building.

View Obstruction: Construction of the ramps would involve clearing of some vegetation from the area, which would open up partial views of San Francisco Bay. Though this clearing would provide new views of the Bay, the ramps would also partially obstruct these views.

Community Disruption/Orientation/Privacy: This alternative would have a negligibly disruptive effect. Though the ramps' massing would be considerable, they would not be out of character with the current visual setting. In addition, construction of the ramps would also result in the opening of partial San Francisco Bay views.

Overall Visual Quality: On the whole, this alternative would have a minimally adverse effect on the viewpoint's visual quality. Construction of the ramps would do little to harmonize the relationship between the transportation infrastructure of YBI and its surrounding natural environment. Though new views of the Bay would become available and the ramps would be partially obstructed by the site's existing vegetation, a significant portion of their massing would tower over viewers situated at this location.

Resulting Visual Impact: Overall viewer response would be minimally adverse, as would the change in visual quality and character. The resulting visual impact would be minimally adverse.

Figure 6: Alternative 2B  
Key Viewpoint 1: Macalla Road at North Gate Road Intersection



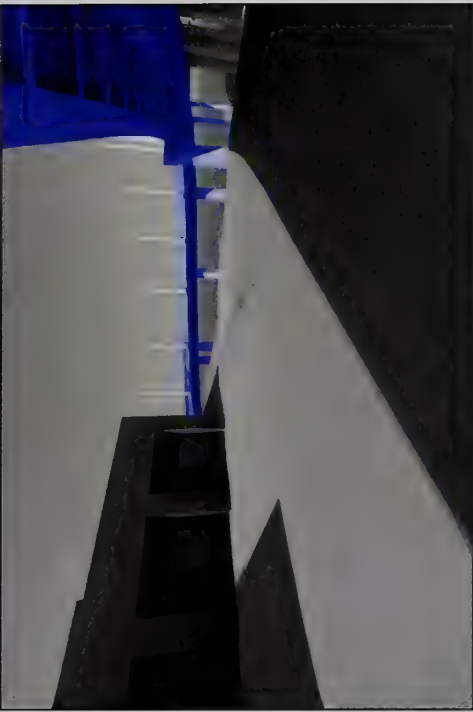
Rendered View



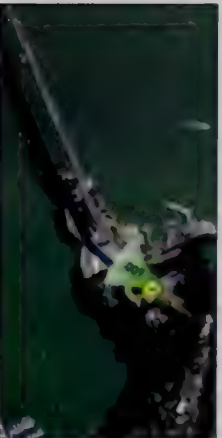
Quarters 10  
to be relocated as part of Alt. 2B



Building 267  
to be relocated as part of Alt. 2B



Alternative 2B Ramp Components: Blue highlighting distinguishes Alternative 2B ramp components from SFO88 East Span project components



Geographic Context  
Indicates distance from viewpoint to  
Alternative 2B ramp components





## **Key Viewpoint 2 – Nimitz House**

### ***Orientation***

This key viewpoint looks northeast from the patio of the Nimitz House, one of the historic US Navy structures located on the island. **Figure 7** depicts a photo-simulation of Alternative 2B from this viewpoint.

### ***Landscape Unit***

Greater YBI landscape unit.

### ***Viewer Groups***

This viewpoint represents a typical view experienced by recreational users and event attendees.

### ***Existing Visual Quality/Character***

Like Viewpoint 1, Viewpoint 2 also illustrates a close up of the SFOBB alongside mature vegetation. However, this viewpoint has higher vividness than the image presented in Viewpoint 1. In this view, the bridge's structural lines combine in distinct visual patterns, contrasting dramatically with the foliage of the mature eucalyptus trees nearby, the San Francisco Bay, and portions of the East Bay Hills somewhat visible in the background.

From this viewpoint the bridge and trees frame a distant view of the East Bay Hills. This view illustrates a low degree of unity and intactness, given that since construction of the SFOBB East Span Project began, it has been markedly diminished by the presence of SFOBB Transition Structure construction activity occurring in the center of the view.

### ***Proposed Project Features***

Project features visible in this view would include two columns in the right foreground that would support the off-ramp. A portion of the off-ramp would also be visible overhead.

### ***Change to Visual Quality/Character***

**Visual Dominance:** The structural elements added under Alternative 2B would contribute to the overall dominance of the new SFOBB Transition Structure. However, elements of the new SFOBB Transition Structure would comprise most of the new right-of-way visible from this viewpoint, while a smaller visually subordinate portion, visible in the foreground, would form a part of the YBI off-ramp. The off-ramp would be visually subordinate to other elements in the setting.

**View Obstruction:** Implementation of Alternative 2B would result in a partial increase in view obstruction. Two new support columns for the off-ramp and a portion of the off-ramp roadway would partially obstruct views to the east. However, this obstruction would only be minimal relative to elements of the SFOBB Transition Structure that will also obstruct eastward views.

**Community Disruption/Orientation/Privacy:** From this viewpoint, visual changes resulting from implementation of Alternative 2B would be minimally adverse in terms of community disruption, orientation or privacy.

**Overall Visual Quality:** Changes to the vividness of the scene resulting from construction of the off-ramp would be minimal compared to the effect the future SFOBB Transition Structure will have on this viewpoint's vividness. Changes to the view resulting from Alternative 2B would not significantly

Yerba Buena Island Ramps Improvement Project  
Visual Impact Assessment

affect the compositional harmony of the larger viewshed, and very little change in the unity and intactness of the area would result.

Viewers at this location would tend to linger for relatively extended periods of time, given that a good number of them would be at the location in order to attend special events such as weddings. However, this alternative's relatively minor effect on the view's visual quality would result in only a minimally adverse visual experience.

Resulting Visual Impact: Overall viewer response and change in visual character would be minimally adverse. The resulting visual impact would be minimally adverse.

### **Key Viewpoint 3 – Officers Quarters Open Space**

#### ***Orientation***

This key viewpoint looks southeast from a large open space area between Quarters 4 and Quarters 7 toward other historic US Navy structures that include the Nimitz House (Quarters 1), Quarters 2, Building 83 and Building 205. **Figure 8** depicts a photo-simulation of Alternative 2B from this viewpoint.

#### ***Landscape Unit***

Greater YBI landscape unit.

#### ***Viewer Groups***

This viewpoint represents a typical view experienced by YBI residents and recreational users.

#### ***Existing Visual Quality/Character***

This viewpoint presents a moderate to highly vivid scene. Various former US Navy structures stand among lush vegetation, while a segment of the SFOBB East Span is visible in the background. In the view, design elements of the Navy structures can be clearly distinguished and the lines of the SFOBB East Span structure are also vivid.

From this viewpoint, the US Navy structures and the SFOBB East Span are moderately intact and unified. They overlap and obscure each other in space, but not in a way that is inharmonious. The existing vegetation also significantly obscures the buildings and the SFOBB East Span, but the result is that these objects appear to visually complement each other. The area's visual quality is also enhanced by a large open space area, visible in the viewpoint's foreground.

#### ***Proposed Project Features***

Project features visible in this view include a northern portion of the on-ramp, a southern portion of the off-ramp and a total of eight support columns.

#### ***Change to Visual Quality/Character***

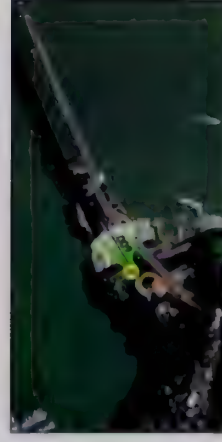
Visual Dominance: The structural elements added under Alternative 2B would contribute to the overall dominance of the new SFOBB Transition Structure. The project's on-ramp and off-ramp structures would visually dominate other objects in the setting.



Figure 7: Alternative 2B  
Key Viewpoint 2: Nimitz House



Simulated View



Geographic Context  
Indicates distance from viewpoint to  
Alternative 2B ramp components



Existing View



Alternative 2B Ramp Components: Blue highlighting distinguishes Alternative 2B ramp components from SFO88 East Span project components





Yerba Buena Island  
Ramps Improvement Project

Figure 8: Alternative 2B  
Key Viewpoint 3: Officers' Quarters Open Space



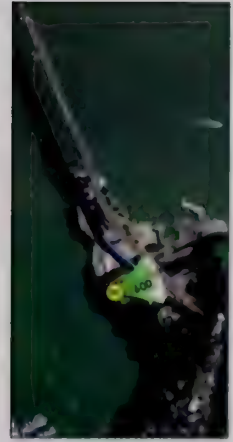
Simulated View



Existing View



Alternative 2B Ramp Components: Blue highlighting distinguishes Alternative 2B ramp components from SFO88 East Span project components



Geographic Context  
Indicates distance from viewpoint to  
Alternative 2B ramp components





## Yerba Buena Island Ramps Improvement Project Visual Impact Assessment

**View Obstruction:** New columns and other structural elements of the on-ramp and off-ramp built as part of this alternative would obstruct views of the SFOBB East Span structure, but would not obstruct views of the US Navy structures, which would remain visible in the foreground.

**Community Disruption/Orientation/Privacy:** Changes to the area shown in this viewpoint would result in a moderately high level of community disruption, given that the visual experience for viewers driving, bicycling or walking in this area would be negatively affected by the scale of the ramp structures. No orientation or privacy related effects would occur.

**Overall Visual Quality:** Changes associated with this alternative would result in a negative effect on the existing vividness of the area, due to the necessary removal of mature vegetation that would be replaced by the ramp structures. The addition of the off-ramp and on-ramp to this view would result in a lowering of the view's intactness and unity. The on-ramp and off-ramp structures would reduce the level of visual harmony that is currently visible from this viewpoint, resulting in an overall strongly adverse change to visual quality. Viewers at this location would tend to travel through the area at a relatively slow speed, given that they would be walking, bicycling or would remain relatively stationary as they recreate in the open space area. Therefore, this alternative's adverse visual effects would be felt strongly by people at this location.

**Resulting Visual Impact:** Overall viewer response and change in visual character would be strongly adverse. The resulting visual impact would be strongly adverse.

### **Key Viewpoint 4 – North Gate Road Staging Area**

#### ***Orientation***

This key viewpoint looks southwest across a construction staging area just northeast of North Gate Road that is being used for the SFOBB East Span construction project. The Nimitz House and thick vegetation in its vicinity are visible in the background. **Figure 9** depicts a photo-simulation of Alternative 2B from this viewpoint.

#### ***Landscape Unit***

Northeast YBI landscape unit.

#### ***Viewer Groups***

This viewpoint represents a typical view experienced by YBI residents and recreational users.

#### ***Existing Visual Quality/Character***

Viewpoint 4 presents a low to moderately vivid image of a construction staging area in the foreground and the Nimitz House situated among mature vegetation visible in the background. Though the image of the Nimitz House and thick vegetation is scenic, the scattered construction materials in the foreground detract from the more vivid features of the scene. The new piling visible in the left side of the frame and the fragmented view of the East Span also detract from the more scenic parts of the view.

In its present state, this viewpoint is characterized as having low unity and intactness. The disturbed nature of the area, due to the presence of the SFOBB East Span construction staging area, has degraded the intactness and unity of the view.

### ***Proposed Project Features***

Project features that would be visible from this viewpoint include large portions of the semi-circular on-ramp and off-ramp structures, along with seven ramp support columns placed in the near vicinity of the Nimitz House. The Macalla Road retaining wall would not be visible from this viewpoint due to the viewer's low viewing angle relative to Macalla Road.

### ***Change to Visual Quality/Character***

**Visual Dominance:** The structural elements of the off-ramp and on-ramp would be co-dominant with elements of the SFOBB East Span. The YBI ramp structures would tower over and visually overshadow the Nimitz House.

**View Obstruction:** The proposed ramps would result in a partial obstruction of views toward the Nimitz House, but none of the ramps' structural elements would obstruct the Nimitz House.

**Community Disruption/Orientation/Privacy:** Changes to the area would result in an adverse visual disruption to viewers driving, bicycling or walking in this area, but no orientation or privacy related effects would occur.

**Overall Visual Quality:** Changes associated with this alternative would moderately affect the area's existing vividness, due to the partial blockage of views toward the Nimitz House and the loss of a significant amount of mature vegetation behind the Nimitz House. The ramp structures associated with this alternative would further reduce the already low level of intactness and unity in this area. This alternative would result in an overall adverse change to the area's visual quality.

**Resulting Visual Impact:** Overall viewer response and change in visual character would be adverse. The resulting visual impact would be adverse.

Currently, relatively few people observe this view. However, over the long term, once construction activity ends and the area is converted to other uses, more people may see the area from this viewpoint, and these viewers would be adversely affected by the low visual quality of the area.

## **Key Viewpoint 5 – Treasure Island**

### ***Orientation***

Viewpoint 5 is a view of YBI looking southeast from the southern shore of Treasure Island. **Figure 10** depicts a photo-simulation of Alternative 2B from this viewpoint.

### ***Landscape Unit***

Bay Water/Shoreline landscape unit.

### ***Viewer Groups***

This viewpoint represents a typical view experienced by recreational users (users of Treasure Island marina).

### ***Existing Visual Quality/Character***

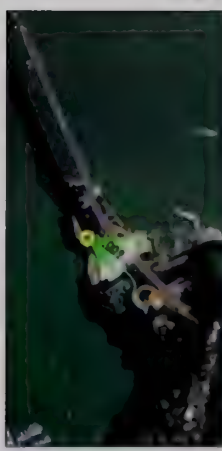
The view from Treasure Island to YBI from this location is moderately vivid. Due to the distance from the bridge, its structural lines are not as evident compared to views seen from locations on YBI. Also, the island's vegetation appears more homogeneous because it isn't possible to



Figure 9: Alternative 2B  
Key Viewpoint 4: North Gate Road Staging Area



Simulated View



Geographic Context  
Indicates distance from viewpoint to  
Alternative 2B ramp components



Existing view is a composite of two images, resulting in natural lens and perspective distortion. Perspective correction was used to produce the simulated view.



Alternative 2B Ramp Components: Blue highlighting distinguishes Alternative 2B ramp components from SFO88 East Span project components





Figure 10: Alternative 2B  
Key Viewpoint 5: Treasure Island



Simulated view



Geographic Context  
Indicates distance from viewpoint to  
Alternative 2B ramp components



Existing View



Alternative 2B Ramp Components; Blue highlighting distinguishes Alternative 2B ramp components from SFO88 East Span project components





## Yerba Buena Island Ramps Improvement Project Visual Impact Assessment

distinguish between different types of vegetation from this distance. However, the contrast between the form of YBI and the line of the Bay shore touching the island is a vivid characteristic of this view, as is the image of the SFOBB touching down on the island.

From this viewpoint, the island has moderate intactness and unity. Only portions of the island and the SFOBB East Span are visible to the viewer. However, the Bay waters do provide a sense of visual coherence and compositional harmony, balancing the lack of complete images of the island and the SFOBB.

### *Proposed Project Features*

From this vantage point, about half a mile from the project site, visible project features would include a thin ribbon-like portion of the off-ramp and four support columns. From this perspective, it would not be possible to see features of the on-ramp.

### *Change to Visual Quality/Character*

**Visual Dominance:** The off-ramp would be visually subordinate in this viewpoint when compared to other elements in the area, and the on-ramp would be in-evident. Though the off-ramp support columns and road deck would be noticeable, they would be less dominant than the future SFOBB Transition Structure, the temporary Transition Structure, SFOBB East Span, San Francisco Bay waters and the YBI land mass.

**View Obstruction:** The ramp structures proposed as part of Alternative 2B would result in a minimal obstruction of elements currently visible from this vantage point. The ramps and columns would be situated such that their profile would nearly mirror the profile of the future SFOBB Transition Structure. To the casual observer, the YBI ramps would not stand out in a distinctive way.

**Community Disruption/Orientation/Privacy:** Alternative 2B would have a negligible effect related to community disruption, orientation or privacy.

**Overall Visual Quality:** This alternative would have a negligible effect on the area's overall visual quality.

**Resulting Visual Impact:** Overall viewer response and change in visual character would be negligible. The resulting visual impact would be negligible.

## **Key Viewpoint 6 – Eastern YBI Waterborne Approach**

### *Orientation*

This viewpoint illustrates a westward view of YBI as if on a waterborne approach to the island. This viewpoint is based about 500 feet east of the island. **Figure 11** depicts a photo-simulation of Alternative 2B from this viewpoint.

### *Landscape Unit*

Bay Water/Shoreline landscape unit.

### *Viewer Groups*

This viewpoint represents a typical view experienced by recreational users and USCG personnel.

### ***Existing Visual Quality/Character***

This view of a waterborne approach to the part of YBI occupied by the USCG provides a high level of vividness for the viewer. From this vantage point, it is possible to very clearly see the structural lines of the SFOBB East Span as it connects to YBI, and it is also possible to observe the structural lines of the temporary Transition Structure currently being built as part of the SFOBB East Span project. This is a dramatic view of the connection between YBI and the SFOBB.

However, this view does not offer the observer a very unified or intact image of the island, of the bridge, or of the USCG facility. Each of these objects is truncated for the viewer, with little visual context to provide information about what lies beyond the frame.

### ***Proposed Project Features***

From this vantage point, a viewer would see a portion of the future SFOBB East Span Transition Structure in the foreground as it approaches the northeastern tip of YBI. In the background, behind the Transition Structure and its support columns, some portions of the YBI off-ramp and on-ramp and several columns would be visible.

### ***Change to Visual Quality/Character***

**Visual Dominance:** The YBI ramps design for Alternative 2B would be visually subordinate in this viewpoint when compared to other elements in the area. Though the YBI ramp columns and road decks would be noticeable, they would be less dominant than the future SFOBB Transition Structure, primarily because the ramps would be partially obstructed by it.

**View Obstruction:** From this viewpoint, the ramp structures would be largely obstructed by the island's landmass and by the SFOBB Transition Structure. The ramps would obstruct existing vegetation and the US Navy buildings in the background.

**Community Disruption/Orientation/Privacy:** This alternative would have no effect related to community disruption, orientation or privacy.

**Vividness:** Implementation of this alternative would not result in a high degree of change to the area's vividness.

**Overall Visual Quality:** The YBI ramps would be noticeable but not dominant from this viewpoint. They would have a minimally adverse effect on the area when observed from this viewpoint.

**Resulting Visual Impact:** Overall change in viewer response and visual character would be minimally adverse. The resulting visual impact would be minimally adverse.

## **Key Viewpoint 7 – SFOBB Oakland Touchdown**

### ***Orientation***

This key viewpoint looks west toward YBI from the SFOBB Oakland Touchdown area, which is located at a distance of about 1.25 miles from the island. **Figure 12** depicts a photo-simulation of Alternative 2B from this viewpoint.



Figure 11: Alternative 2B  
Key Viewpoint 6: Eastern Yerba Buena Island Waterborne Approach



Simulated View



Existing View



Alternative 2B Ramp Components: Blue highlighting distinguishes Alternative 2B ramp components from SFO88 East Span project components



Geographic Context  
Indicates distance from viewpoint to  
Alternative 2B ramp components





Figure 12: Alternative 2B  
Key Viewpoint 7: Oakland Touchdown



Simulated View



View prior to SFOBB east span and Alternative 2B construction



Alternative 2B Ramp Components: Blue highlighting distinguishes Alternative 2B ramp components from SFOBB East Span project components



Geographic Context  
Indicates distance from viewpoint to  
Alternative 2B ramp components





### ***Landscape Unit***

Bay Water/Shoreline landscape unit.

### ***Viewer Groups***

This viewpoint represents a typical view experienced by recreational users.

### ***Existing Visual Quality/Character***

This long range view of the project site from the SFOBB Oakland Touchdown is a vivid perspective of YBI in the context of its surroundings. From this vantage point, the viewer's attention is focused in large part on the SFOBB East Span crossing the Bay from Oakland to San Francisco. YBI is visible, but only as a distant landmass at the end of the SFOBB East Span. From this point of view it is not even clear that YBI is an island, but it is possible to place it visually in the context of setting elements in its vicinity.

This is a highly unified and intact perspective of YBI. From the Oakland Touchdown, an observer can clearly see a large part of the island's landmass, though as mentioned before, an uninitiated viewer would not necessarily realize it is an island. Nevertheless, the presence of a large part of the SFOBB East Span in the frame, as well as small glimpses of the West Span, downtown San Francisco skyscrapers and buildings on Treasure Island result in a very intact and unified scene.

### ***Proposed Project Features***

At such a distance from YBI, viewers at the Oakland Touchdown area would have difficulty discerning the ramp project's features, though some ramp features would be slightly visible among a grouping of SFOBB Transition Structure columns and the SFOBB East Span.

### ***Change to Visual Quality/Character***

**Visual Dominance:** Alternative 2B's ramps would be in-evident from the Oakland Touchdown area, due to the relatively long distance to YBI. From this vantage point, the ramps would be difficult to discern by the casual viewer. As shown in the Alternative 2B Ramp Components inset of Figure 12, the ramps would be so indiscernible that the blue highlighting used to distinguish the ramps is not visible.

**View Obstruction:** The ramp structures designed for this alternative would result in very minimal view obstruction. From this vantage point, the ramps would be difficult to discern by the casual viewer, yet they would nevertheless contribute to the partial obstruction of YBI that the SFOBB produces for Oakland Touchdown viewers. From this vantage point, elements of the YBI ramps and the SFOBB, especially their support columns, appear to meld together in a dense cluster, making it difficult to distinguish elements of the ramps from elements of the SFOBB. Obstruction that is attributable to the YBI ramps would be minimal.

**Community Disruption/Orientation/Privacy:** Because structural elements of this alternative would be difficult to identify from this distance, the project's effect would be negligible.

**Overall Visual Quality:** From this vantage point, the structural elements associated with Alternative 2B would be difficult for the casual viewer to discern. Therefore, the overall change in visual quality resulting from this alternative would be negligible.

Yerba Buena Island Ramps Improvement Project  
Visual Impact Assessment

Resulting Visual Impact: Overall change in viewer response and visual character would be negligible. The resulting visual impact would be negligible.

**Key Viewpoint 8 – SFOBB Transition Structure**

Given that construction of the new SFOBB East Span has not been completed, and this viewpoint does not yet physically exist, analysis of this viewpoint is based on a rendering rather than a photo-simulation.

***Orientation***

This viewpoint is toward the southwest from the future roadway of the SFOBB East Span as it approaches the YBI tunnel. **Figure 13** depicts a rendering of Alternative 2B from this viewpoint.

***Landscape Unit***

Bay Water/Shoreline landscape unit.

***Viewer Groups***

This viewpoint represents a typical view experienced by freeway travelers.

***Existing Visual Quality/Character***

Because construction of the new SFOBB East Span is not yet complete, and this vantage point is from the future East Span roadway, it is not possible to describe the existing visual character of this viewpoint. Therefore, Figure 13 shows only a rendering of the future vantage point, rather than a before image and a photo-visual simulation of the viewpoint.

***Proposed Project Features***

From this vantage point, a motorist approaching YBI would see only a very small portion of the off-ramp and five of its light standards near the viewer's line of sight vanishing point. No portion of the on-ramp would be visible.

***Expected Visual Quality/Character***

**Visual Dominance:** The project would have a subordinate visual effect when viewed from this vantage point. A small sliver of the off-ramp would be visible in the center of the view, as would associated amenities such as crash barrels and exit signage. However, the most dominant features visible to the viewer would be the SFOBB Transition Structure roadway as it extends into the distance, as well as the YBI landmass.

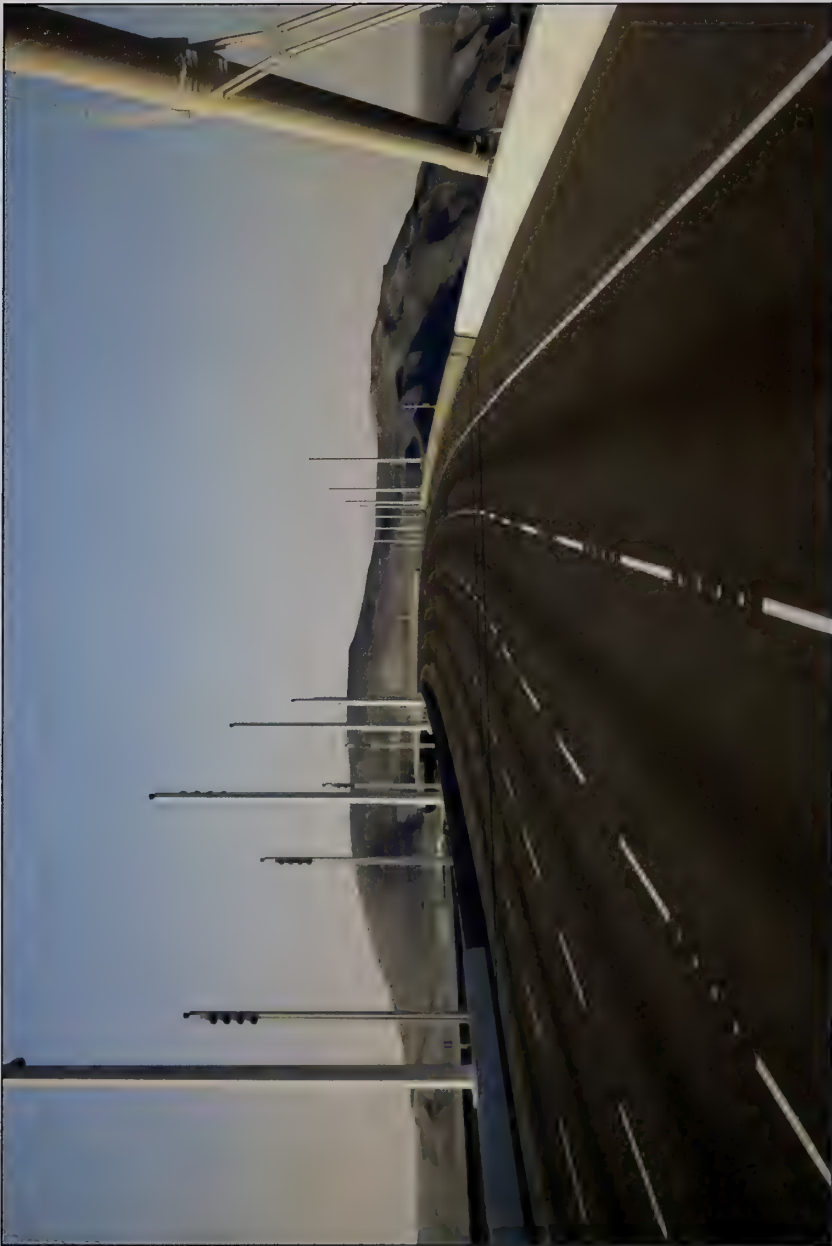
**View Obstruction:** The off-ramp would be almost imperceptible from this vantage point and any view obstruction attributable to the ramp would be negligible.

**Community Disruption/Orientation/Privacy:** Because structural elements of this alternative would be difficult to discern, the project's effect would be negligible.

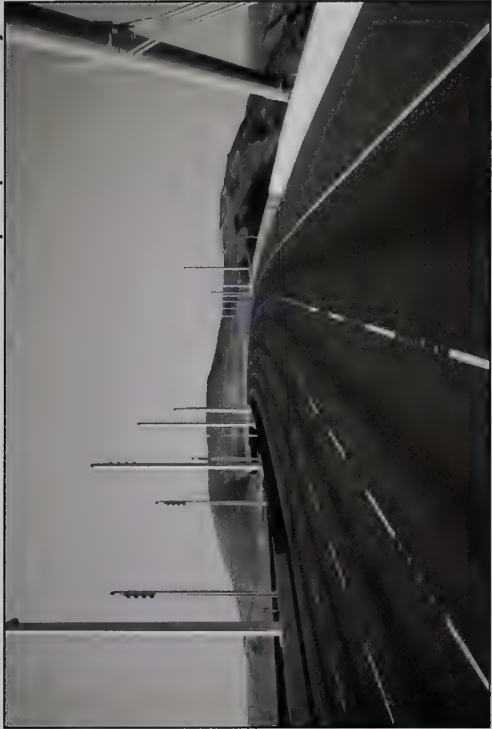
**Overall Visual Quality:** This is a view illustrating the perspective of a motorist crossing the SFOBB East Span Transition Structure and approaching the YBI Tunnel. From this location, the off-ramp would not be a prominent element of the view seen by motorists. The off-ramp would be a subordinate element in the view, and any effect this alternative would have on the overall visual quality of the area would be negligible.

Figure 13: Alternative 2B

Key Viewpoint 8: San Francisco-Oakland Bay Bridge Transition Structure



Rendered View



Alternative 2B Ramp Components: Blue highlighting distinguishes Alternative 2B ramp components from SFOBB East Span project components



Geographic Context  
Indicates distance from viewpoint to  
Alternative 2B ramp components

Yerba Buena Island  
Ramps Improvement Project





## Yerba Buena Island Ramps Improvement Project Visual Impact Assessment

Resulting Visual Impact: Overall change in viewer response and visual character would be negligible. The resulting visual impact would be negligible.

### **Alternative 4**

#### **Key Viewpoint 1 – Macalla at North Gate Intersection**

Analysis of this viewpoint is based on a rendering rather than a photo-simulation. As discussed at the beginning of the Alternative 2B analysis, implementation of that alternative would require removal of Quarters 10 (a US Navy residential structure) and Building 267 (a garage associated with Quarters 10), in order to provide right-of-way for the YBI ramps. Quarters 10 is not visible from this vantage point. Therefore, it would be inaccurate to present a “before” image of the vantage point when a structure that would be drastically affected by the project is not visible in the image. For this reason, a rendering was chosen as a means to illustrate the visual effect of the ramps at the intersection of Macalla Road and North Gate Road.

Implementation of the Alternative 4 design would not require removal of Quarters 10 or Building 267. However, in order to ensure analytical consistency in this visual impact assessment, a rendering was also chosen as a tool to illustrate the visual effect of the Alternative 4 design as experienced from this viewpoint.

#### ***Orientation***

This key viewpoint looks northeast from the intersection of Macalla Road and North Gate Drive. **Figure 14** depicts a rendering of Alternative 4. Implementation of this alternative would not affect Quarters 10 or Building 267, as would occur if Alternative 2B is implemented.

#### ***Landscape Unit***

Greater YBI landscape unit.

#### ***Viewer Groups***

This viewpoint represents a typical view experienced by YBI residents.

#### ***Existing Visual Quality/Character***

This area of the island is dominated by the presence of the double deck structure of the SFOBB East Span structure as it nears the YBI tunnel. The view presented in this viewpoint is a vivid microcosm of the island itself, in that on YBI there is often an inter-play between the natural environment and the SFOBB. In this view, the bridge’s intactness and unity are relatively low, due to the large scale and omnipresence of the road decks when viewed from such close proximity. Overall unity and intactness of the view is low when all of its elements are taken together. The substation on the left side of the view, Building 267, the mature eucalyptus trees and the road decks present a cluttered scene where natural features and human made features do not visually complement each other.

#### ***Proposed Project Features***

Project features visible from this vantage point include the terminus of the off-ramp as it touches down onto the island at the intersection of Macalla Road and North Gate Road, as well as a short stretch of the on-ramp running over the off-ramp’s terminus.

### ***Change to Visual Quality/Character***

**Visual Dominance:** The ramp elements associated with Alternative 4 would be co-dominant in the view relative to other area features, in that the substation, existing vegetation and the ramps would all vie for the viewer's attention.

**View Obstruction:** Construction of the ramps would involve clearing of some vegetation from the area, which would open up partial (very minimal) views of San Francisco Bay. Though this clearing would provide new views of the Bay, the ramps would also partially obstruct these views.

**Community Disruption/Orientation/Privacy:** This alternative would have a negligibly disruptive visual effect on the community, and would not impair orientation or privacy. The opening of partial San Francisco Bay views would be a beneficial though slight effect of this alternative.

**Overall Visual Quality:** On the whole, this alternative would have a minimally adverse effect on visual quality. Construction of the ramps would do little to harmonize the relationship between the transportation infrastructure of YBI and its surrounding natural environment, but the ramps would not reduce existing visual quality. In addition, new views of the Bay would become available, though these would be quite minimal.

**Resulting Visual Impact:** Overall change in viewer response and visual character would be minimally adverse. The resulting visual impact would be minimally adverse.

### **Key Viewpoint 2 – Nimitz House**

#### ***Orientation***

This key viewpoint looks northeast from the patio of the Nimitz House, one of the historic US Navy structures located on the island. **Figure 15** depicts a photo-simulation of Alternative 4 from this viewpoint.

#### ***Landscape Unit***

Greater YBI landscape unit.

#### ***Viewer Groups***

This viewpoint represents a typical view experienced by recreational users and event attendees.

### ***Existing Visual Quality/Character***

Like Viewpoint 1, Viewpoint 2 illustrates a close up of the SFOBB alongside mature vegetation. However, this viewpoint exhibits higher vividness than the image presented in Viewpoint 1. In this view, the bridge's structural lines combine in distinct visual patterns, contrasting dramatically with the foliage of the mature eucalyptus trees nearby, and portions of the East Bay Hills somewhat visible in the background.

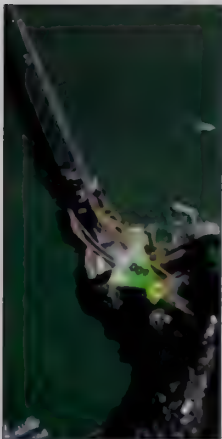
From this viewpoint the bridge and tree frame a distant view of the East Bay hills, providing a low degree of unity and intactness, given that this view is now markedly diminished as a result of the SFOBB Transition Structure construction activity occurring in the center of the view.



Figure 14: Alternative 4  
Key Viewpoint 1: Macalla Road at North Gate Road Intersection



Rendered View



Geographic Context  
Indicates distance from viewpoint to  
Alternative 4 ramp components



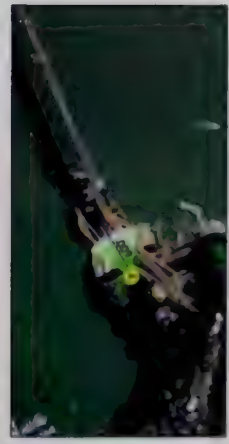
Alternative 4 Ramp Components: Orange highlighting distinguishes Alternative 4 ramp components from SFOBB East Span project components



Figure 15: Alternative 4  
Key Viewpoint 2: Nimitz House



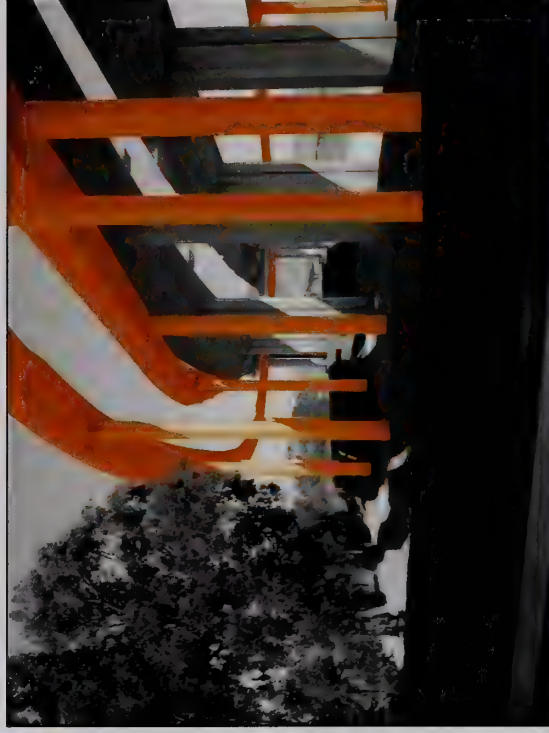
Simulated View



Geographic Context  
Indicates distance from viewpoint to  
Alternative 4 ramp components



Existing View



Alternative 4 Ramp Components: Orange highlighting distinguishes Alternative 4 ramp components from SFOB8 East Span project components





### ***Proposed Project Features***

Project features visible in this view include a large portion of the on-ramp as it passes underneath the future SFOBB Transition Structure from right to left making its way toward the Nimitz House. Also visible is a short stretch of the off-ramp as it descends on its path to the intersection of Macalla Road and North Gate Road, out of view behind the Nimitz House. The on-ramp is the left-most road deck visible in the viewpoint, while the off-ramp is situated immediately to the right of the on-ramp.

### ***Change to Visual Quality/Character***

**Visual Dominance:** The future SFOBB Transition Structure would extend further left into the viewer's line of sight than the existing SFOBB East Span structure. The YBI on-ramp would loop under the SFOBB Transition Structure and travel toward the viewer as it makes its way in a southwesterly direction toward an eventual connection with the Transition Structure. (The viewer would need to turn completely around to see this connection.) From this viewpoint, the off-ramp and on-ramp would be co-dominant with the future SFOBB Transition Structure.

**View Obstruction:** This alternative would result in a partial obstruction of views toward the East Bay Hills. However, the level of obstruction would be considered less than that caused by the road decks and columns of the SFOBB East Span project visible from this vantage point.

**Community Disruption/Orientation/Privacy:** This is not a viewpoint that people experience for extended periods of time, given that the Nimitz House is no longer used as a residence, but rather for public events such as weddings. Visitors to the house are not generally passing through on their way to another location, but instead find themselves at their final destination. In general, people would experience this view on a short term basis when compared to the length of viewer exposure if the Nimitz House had permanent residents. Given the scale of the proposed ramps, and the nature of the special events that bring people to the location, the visual effect of the YBI ramps on viewers would be adverse.

**Overall Visual Quality:** This alternative would result in an overall adverse effect on the visual quality of the viewpoint. Though most viewers observing this viewpoint would experience it on a temporary basis, the type of special events they would attend at the Nimitz House would usually benefit from an ambience of high visual quality. This alternative would lead to a further reduction of visual quality beyond the reduction that is attributable to the physical elements of SFOBB East Span project.

**Resulting Visual Impact:** Overall change in viewer response and visual character would be minimally adverse. The resulting visual impact would be minimally adverse.

## **Key Viewpoint 3 – Officers Quarters Open Space**

### ***Orientation***

This key viewpoint looks southeast from a large lawn area between Quarters 4 and 7 toward the other historic US Navy structures, including the Nimitz House (Quarters 1), Quarters 2, Building 83 and Building 205. **Figure 16** depicts a photo-simulation of Alternative 4 from this viewpoint.

### ***Landscape Unit***

Greater YBI landscape unit.

### *Viewer Groups*

This viewpoint represents a typical view experienced by YBI residents and recreational users.

### *Existing Visual Quality/Character*

This viewpoint presents a moderate to highly vivid scene of typical image types that can be found on YBI. Various former US Navy structures stand among lush vegetation, while a segment of the SFOBB East Span is present in the background. Design elements of the Navy structures can be clearly distinguished and the lines of the East Span structure are also vivid.

The US Navy structures and the SFOBB East Span are moderately intact and unified. They overlap and obscure each other in space, but not in a way that is inharmonious. The existing vegetation also significantly obscures the buildings and the SFOBB East Span, but as a result, these objects appear to co-exist in a complementary manner.

### *Proposed Project Features*

Project features visible in this view include a short stretch of the on-ramp as it passes over North Gate Road on the east side of the SFOBB Transition Structure. A larger portion of the on-ramp located west of the Transition Structure would also be visible, as would a small stretch of the off-ramp as it nears its terminus at North Gate Road and Macalla Road. Portions of three YBI ramp columns supporting the ramps would also be visible.

### *Change to Visual Quality/Character*

**Visual Dominance:** The structural additions associated with this alternative would be co-dominant with other features of the view. The massing of the off-ramp and on-ramp would pass across the viewer's line of sight, roughly paralleling the massing of the double decked SFOBB Transition Structure. The visual dominance of the YBI ramps would be fairly equal to the dominance of the Transition Structure.

**View Obstruction:** New columns and other structural elements of the on-ramp and off-ramp would obstruct views of the SFOBB East Span structure, but would not obstruct views of the US Navy structures, which would remain visible in the foreground.

**Community Disruption/Orientation/Privacy:** Changes to the area shown in this viewpoint would result in a low level of community disruption. The visual experience for viewers driving, bicycling or walking in this area would not be negatively affected by the scale of the ramp structures, and no orientation or privacy related effects would occur.

**Overall Visual Quality:** This alternative would result in an overall minimally adverse effect on the visual quality of the viewpoint. Under current conditions, the SFOBB East Span passes over and behind the US Navy structures, with a left to right movement of massing that appears to float elegantly in mid air. The Alternative 4 design would involve construction of ramp road decks and columns behind and in front of the SFOBB Transition Structure that would not on the whole present a bulkier image. However, elements of the new design would lend it an overall wider vertical (ramp decks) and horizontal (columns) profile when compared to the image presented by the current bridge structure.

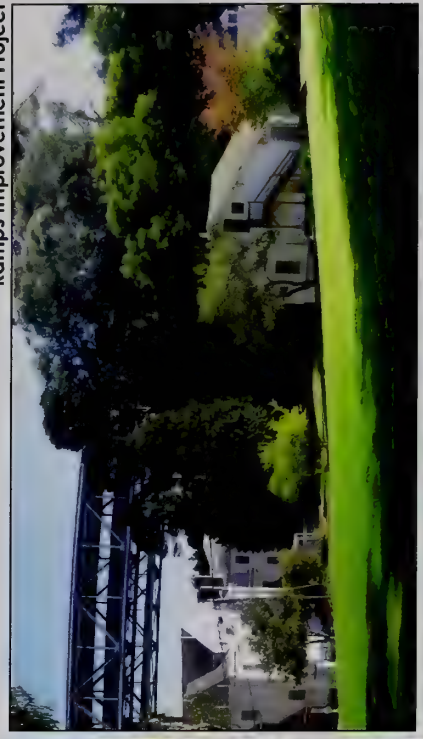


Yerba Buena Island  
Ramps Improvement Project

Figure 16: Alternative 4  
Key Viewpoint 3: Officers' Quarters Open Space



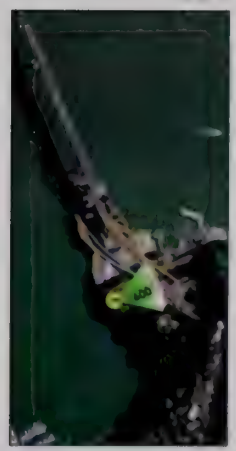
Simulated View



Existing View



Alternative 4 Ramp Components: Orange highlighting distinguishes Alternative 4 ramp components from SFO88 East Span project components



Geographic Context  
Indicates distance from viewpoint to  
Alternative 4 ramp components



## Yerba Buena Island Ramps Improvement Project Visual Impact Assessment

Resulting Visual Impact: Overall change in viewer response and visual character would be strongly adverse. The resulting visual impact would be strongly adverse.

### **Key Viewpoint 4 – North Gate Road Staging Area**

#### ***Orientation***

This key viewpoint is toward the southwest across a construction staging area located northeast of North Gate Road that is being used for the SFOBB East Span construction project. The Nimitz House and thick vegetation in its vicinity are visible in the background. **Figure 17** depicts a photo-simulation of Alternative 4 from this viewpoint.

#### ***Landscape Unit***

Northeast YBI landscape unit.

#### ***Viewer Groups***

This viewpoint represents a typical view experienced by YBI residents and recreational users.

#### ***Existing Visual Quality/Character***

Viewpoint 4 presents a low to moderately vivid image of a construction staging area in the foreground and the Nimitz House situated among mature vegetation visible in the background. Though the image of the Nimitz House and the thick vegetation in its vicinity is scenic, the scattered construction materials in the foreground detract from more vivid features. The new piling that is associated with the SFOBB project and is visible in the left side of the frame, along with the fragmented view of the SFOBB East Span, all adversely counteract the more scenic elements of the view.

In its present state, this viewpoint is characterized as having low unity and intactness. The disturbed nature of the area, which is attributed to construction of the SFOBB East Span, degrades the intactness and unity of the scene.

#### ***Proposed Project Features***

This viewpoint presents a southwestern view of project features, including nine columns that would support portions of the on-ramp and off-ramp. Portions of the ramp decks are visible, though less prominent, than the dominant massing of the columns.

#### ***Change to Visual Quality/Character***

**Visual Dominance:** Compared to the existing view, the structures proposed in this alternative would markedly dominate the viewer's line of sight. As described above, the ramp support columns would have the most visually dominating effect, while the ramp decks would play a less dominant role.

**View Obstruction:** This alternative would result in a partial, though very large obstruction of the view. The currently unobstructed view of the Nimitz House and the mature vegetation in its vicinity would be considerably obstructed by the columns supporting the proposed ramp decks.

**Community Disruption/Orientation/Privacy:** This viewpoint presents a view of the project site that encompasses an area currently used for SFOBB East Span construction staging, and is therefore not a place where many users of the island tend to linger for long periods of time. However, the viewpoint is near North Gate Road, which is a public right-of-way that is accessible to automobiles,



## Yerba Buena Island Ramps Improvement Project Visual Impact Assessment

bicycles and pedestrians. Over the long term, after SFOBB East Span construction activities end, the construction staging area would be converted to another use. If the new use facilitates or encourages the presence of motorists, bicyclists, pedestrians, or permanent residents, users would be considerably affected by the visually disruptive and strongly adverse effects of Alternative 4.

**Overall Visual Quality:** The ramp structures would result in a strongly adverse visual effect for viewers observing the area. The scene's visual quality is already at a low level, given the adverse effect produced by the SFOBB project's construction staging area. The view's vividness, intactness and unity would decline further upon implementation of Alternative 4. Over the long term, the construction staging area would be converted to another use. Whatever that new use will be, it is unlikely that visitors to the area would be able to avoid views of the YBI ramps. Therefore, it is expected that visual quality in this area would remain at a low level over the long term. Future users of the area would be adversely affected, especially if they spend relatively long periods of time at the location.

**Resulting Visual Impact:** Overall change in viewer response and visual character would be adverse. The resulting visual impact would be adverse.

### **Key Viewpoint 5 – Treasure Island**

#### ***Orientation***

Viewpoint 5 is a view of YBI looking southeast from the southern shore of Treasure Island.

**Figure 18** depicts a photo-simulation of Alternative 4 from this viewpoint.

#### ***Landscape Unit***

Bay Water/Shoreline landscape unit.

#### ***Viewer Groups***

This viewpoint represents a typical view experienced by recreational users (users of the Treasure Island marina).

#### ***Existing Visual Quality/Character***

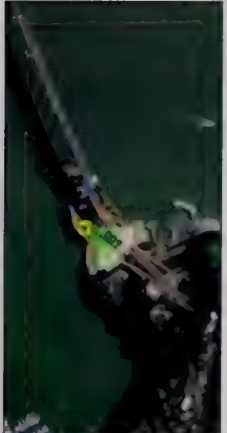
The view from Treasure Island to YBI from this location is moderately vivid. Due to the distance from the bridge, its structural lines are not as evident compared to views seen from locations on YBI. However, the contrast between the form of YBI and the line of the Bay shore touching the island is a vivid characteristic of this view, as is the image of the SFOBB touching down on the island.

From this viewpoint, the island has moderate intactness and unity. Only portions of the island and the SFOBB East Span are visible to the viewer. However, the Bay waters do provide some sense of visual coherence and compositional harmony, balancing the lack of complete images of the island and the SFOBB.

Figure 17: Alternative 4  
Key Viewpoint 4: North Gate Road Staging Area



Simulated View



Geographic Context  
Indicates distance from viewpoint to  
Alternative 4 ramp components



Existing view is a composite of two images, resulting in natural lens and perspective distortion. Perspective correction was used to produce the simulated view.



Alternative 4 Ramp Components: Orange highlighting distinguishes Alternative 4 ramp components from SFOB East Span project components

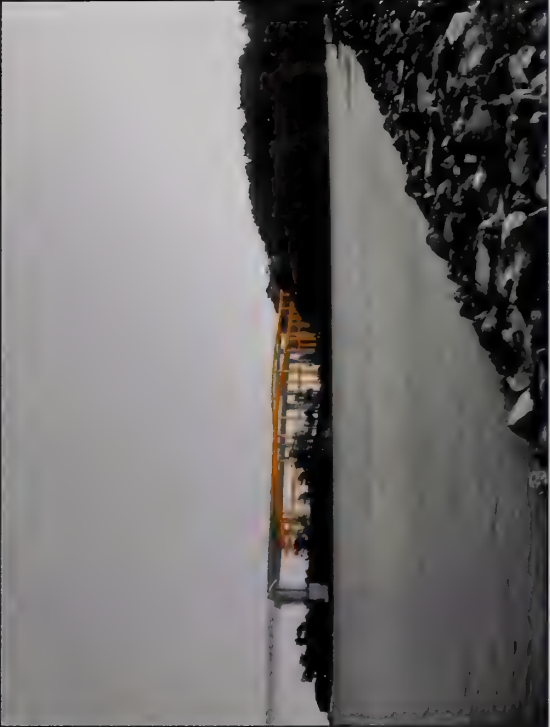




Figure 18: Alternative 4  
Key Viewpoint 5: Treasure Island



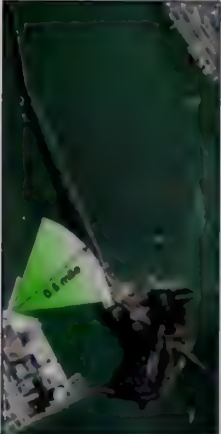
Existing View



Alternative 4 Ramp Components: Orange highlighting distinguishes Alternative 4 ramp components from SFO88 East Span project components



Simulated View



Geographic Context  
Indicates distance from viewpoint to  
Alternative 4 ramp components



### ***Proposed Project Features***

This viewpoint, compared to others that illustrate the proposed Alternative 4 ramp designs, allows the viewer to observe the ramps nearly in their entirety. From this perspective, the viewer would see almost the entire profile of the off-ramp as it descends from the Transition Structure, as well as almost the entire profile of the on-ramp as it loops underneath the Transition Structure.

### ***Change to Visual Quality/Character***

**Visual Dominance:** The ramp structures associated with Alternative 4 would be co-dominant in the visual setting. From the southern shore of Treasure Island, the viewer would have a nearly “head-on” perspective of the ramps and the ramps would be as visually dominant from this perspective as the SFOBB East Span and the YBI land mass.

**View Obstruction:** The ramp structures would partially obstruct views of the mature vegetation located on the northeastern tip of YBI and would also partially block views of the future SFOBB Transition Structure.

**Community Disruption/Orientation/Privacy:** This alternative would have no effect related to orientation or privacy, but would have an adverse effect related to community disruption. From this vantage point, a viewer observing the SFOBB East Span would see the thin bands of the Transition Structure decks crossing the near horizon from left to right as they connect to YBI. If Alternative 4 were built, the viewer would see a more cluttered horizon; the YBI ramps cluttering the simple lines of the Transition Structure.

**Overall Visual Quality:** Alternative 4 would adversely affect the visual quality of the area as seen from this vantage point. The view is currently considered moderately vivid, and its unity and intactness are low. As discussed above, the view’s positive attributes are counteracted by its negative characteristics, resulting in a relatively neutral level of visual quality. However, the ramp structures associated with this alternative would tip the balance, lessening the area’s visual quality. Viewers in this area currently consist of people that work at the Sailing Center facility located along the shoreline and other visitors that pass through this publicly accessible location. The former group would have frequent, long duration views of the project area, and would be susceptible to the adverse effects of this alternative. Visitors would be more transient, though it is assumed they would most likely be in the area for recreational purposes, and would also be adversely affected by the view’s low visual quality. Over the long term, this area is designated by the Treasure Island Development Plan to be the site of recreational open space and residential land uses. These future uses would be adversely affected by the project’s visual impact, given that viewers at this location would tend to spend long amounts of time viewing the YBI ramps.

**Resulting Visual Impact:** Overall change in viewer response and visual character would be negligible. The resulting visual impact would be negligible.

### **Key Viewpoint 6 – Eastern YBI Waterborne Approach**

#### ***Orientation***

This viewpoint illustrates a westward view of YBI as if on a waterborne approach to the island, from about 500 feet offshore. **Figure 19** depicts a photo-simulation of Alternative 4 from this viewpoint.



### ***Landscape Unit***

Bay Water/Shoreline landscape unit.

### ***Viewer Groups***

This viewpoint represents a typical view experienced by recreational users and USCG personnel.

### ***Existing Visual Quality/Character***

This view of a waterborne approach to the area of YBI occupied by the USCG provides a high level of vividness for the viewer. From this vantage point, it is possible to very clearly see the structural lines of the SFOBB East Span as it connects to YBI, and it is also possible to observe the structural lines of the temporary Transition Structure currently being built as part of the SFOBB East Span project. This is a dramatic view of the connection between YBI and the SFOBB.

However, this view does not offer the observer a very unified or intact image of the island, of the bridge, or of the USCG facility. Each of these objects is truncated for the viewer, with little visual context providing information about what lies beyond the frame.

### ***Proposed Project Features***

Project features visible from this viewpoint include a section of the on-ramp located on the southern side of the Transition Structure, a section of the off-ramp structure, located on the northern side of the Transition Structure and support columns. From this viewpoint it is possible to see the on-ramp passing alongside and just below the level of the Transition Structure. The small section of the off-ramp that is visible is descending from the Transition Structure as it makes its way to the intersection of Macalla and North Gate Road.

### ***Change to Visual Quality/Character***

**Visual Dominance:** On a waterborne approach to the USCG facility at YBI, the ramp structures would be co-dominant with other elements of the setting. The on-ramp, visible in front of the SFOBB Transition Structure, and the off-ramp, visible behind it, would visually parallel the equally dominant Transition Structure.

**View Obstruction:** The ramp structures would partially obstruct views of the Transition Structure and would also partially obstruct scant existing views of the Nimitz House and Quarters 2.

**Community Disruption/Orientation/Privacy:** This alternative would have no effect related to orientation or privacy, but would have an adverse effect related to community disruption. In general, people observing this view would be preparing to dock at the USCG facility, or would be engaged in recreational boating activities. As in the case of Viewpoint 5, the massing of the ramps would clutter the visual horizon.

**Overall Visual Quality:** Alternative 4 would adversely affect the visual quality of the area. From a viewer's perspective, the on-ramp would cross their line of sight from left to right in front of the SFOBB Transition Structure while the off-ramp would pass behind the Transition Structure. The movement of the ramps has the effect of cluttering and "crowding out" the thin, simple lines of the Transition Structure. Compared to other viewpoints, relatively few people would observe this view. However, a number of these people would be involved in recreational boating activities that

Figure 19: Alternative 4

Key Viewpoint 6: Eastern Yerba Buena Island Waterborne Approach



Simulated View



Geographic Context  
Indicates distance from viewpoint to  
Alternative 4 ramp components

Yerba Buena Island  
Ramps Improvement Project



Existing View



Alternative 4 Ramp Components: Orange highlighting distinguishes Alternative 4 ramp components from SFO88 East Span project components





## Yerba Buena Island Ramps Improvement Project Visual Impact Assessment

would necessitate relatively long exposure to views of the ramps, and their enjoyment of the area would be diminished by the structural elements of Alternative 4.

Resulting Visual Impact: Overall change in viewer response and visual character would be minimally adverse. The resulting visual impact would be minimally adverse.

### **Key Viewpoint 7 – SFOBB Oakland Touchdown**

#### ***Orientation***

This key viewpoint looks west toward YBI from the SFOBB Oakland Touchdown area, which is located at a distance of about 1.25 miles from the island. **Figure 20** depicts a photo-simulation of Alternative 4 from this viewpoint.

#### ***Landscape Unit***

Bay Water/Shoreline landscape unit.

#### ***Viewer Groups***

This viewpoint represents a typical view experienced by recreational users.

#### ***Existing Visual Quality/Character***

From this vantage point, the viewer's attention is focused in large part on the SFOBB East Span crossing the Bay from Oakland to San Francisco. YBI is visible, but is not at the center of a viewer's attention. The overall vividness of the view is quite high. From this vantage point, the viewer's line of sight encompasses various notable features, including the SFOBB East Span, YBI, the San Francisco skyline partially visible behind YBI, Treasure Island, a portion of Angel Island and the San Francisco Bay.

This view is a highly unified and intact perspective of YBI. From the Oakland Touchdown, an observer can clearly see a large part of the island's landmass, though a casual viewer would not necessarily realize it is an island. Nevertheless, the presence of a large part of the SFOBB East Span in the view, as well as glimpses of other notable area features, produce a very intact and unified scene.

#### ***Proposed Project Features***

Alternative 4 project features are somewhat difficult to discern from features of the SFOBB and its Transition Structure, due to the relatively long distance between the viewer and the YBI ramp structures. Nevertheless, a viewer would be able to identify the on-ramp as it loops underneath and around the Transition Structure.

#### ***Change to Visual Quality/Character***

**Visual Dominance:** From this viewpoint, the Alternative 4 ramp structures would be in-evident to the casual viewer. Though the ramps would be visible, the viewer's attention would be drawn to more dominant features of the view, including the SFOBB East Span, YBI, the San Francisco skyline partially visible behind YBI, Treasure Island, a portion of Angel Island and San Francisco Bay.

**View Obstruction:** The ramp structures would minimally obstruct views of the northeastern tip of YBI, but not to a greater extent than obstruction attributable to the existing SFOBB East Span or the future SFOBB East Span structure.

Yerba Buena Island Ramps Improvement Project  
Visual Impact Assessment

**Community Disruption/Orientation/Privacy:** Given that the ramps would be difficult for the casual viewer to discern, this alternative would have no effect related to community disruption, orientation or privacy.

**Overall Visual Quality:** The ramp structures would have an overall negligible effect on the visual quality of the view from the SFOBB Oakland Touchdown. Though the ramps would be visible, they would result in little or no visual change and no tangible reduction or increase in visual quality. No negative or positive viewer response would be expected.

**Resulting Visual Impact:** Overall change in viewer response and visual character would be negligible. The resulting visual impact would be negligible.

**Key Viewpoint 8 – SFOBB Transition Structure**

Given that construction of the new SFOBB East Span has not been completed, analysis of this viewpoint is based on a rendering rather than a photo-simulation.

***Orientation***

This key viewpoint is toward the southwest from the future roadway of the SFOBB East Span as it approaches the island.

***Landscape Unit***

Bay Water/Shoreline landscape unit.

***Viewer Groups***

This viewpoint represents a typical view experienced by freeway travelers.

***Existing Visual Quality/Character***

Because construction of the SFOBB East Span is not complete, and this viewpoint is from the roadway of the future East Span, it is not possible to describe the existing visual character of this viewpoint. Therefore, **Figure 21** shows only a rendering of the future view from this vantage point, rather than an image of an existing view followed by a photo-visual simulation as it would look after project implementation.

***Proposed Project Features***

As motorists approach the YBI tunnel while driving in a westerly direction, from this viewpoint they would see a small portion of the on-ramp as it ascends onto the SFOBB.

***Expected Visual Quality/Character***

**Visual Dominance:** The on-ramp would be visible on the right side of the view as a motorist travels on the SFOBB East Span. From this location, the ramp would be visible but subordinate to other elements of the setting.

Figure 20: Alternative 4  
Key Viewpoint 7: Oakland Touchdown



Simulated View



View prior to SFOB8 east span and Alternative 4 construction



Alternative 4 Ramp Components: Orange highlighting distinguishes Alternative 4 ramp components from SFOB8 East Span project components



Geographic Context  
Indicates distance from viewpoint to  
Alternative 4 ramp components

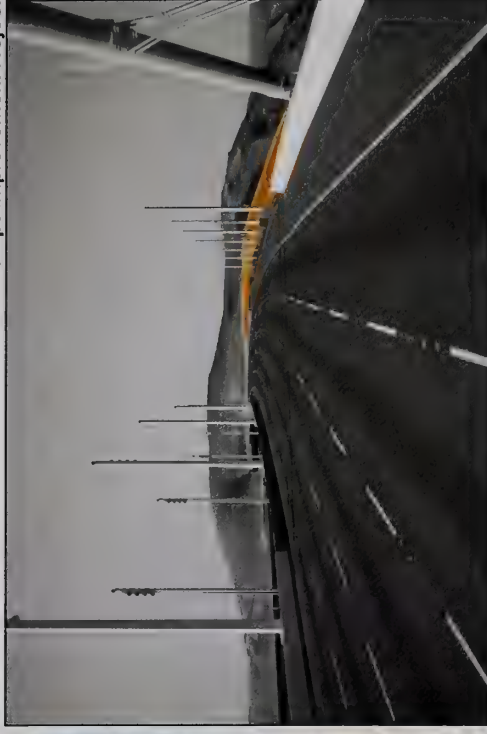




Figure 21: Alternative 4  
Key Viewpoint 8: San Francisco-Oakland Bay Bridge Transition Structure



Rendered View



Alternative 4 Ramp Components: Orange highlighting distinguishes Alternative 4 ramp components from SFO88 East Span project components



Geographic Context  
Indicates distance from viewpoint to  
Alternative 4 ramp components





Yerba Buena Island Ramps Improvement Project  
Visual Impact Assessment

**View Obstruction:** The on-ramp would partially obstruct views toward YBI. However, the level of obstruction attributable to the ramp would be relatively minimal compared to the obstruction caused by the SFOBB East Span.

**Community Disruption/Orientation/Privacy:** Alternative 4 would have a negligible effect related to community disruption, orientation and privacy.

**Overall Visual Quality:** The on-ramp would have an overall negligible effect on the visual quality of the view. Though the ramp would be visible, it would result in little or no visual change and no tangible reduction or increase in visual quality.

**Resulting Visual Impact:** Overall change in viewer response and visual character would be negligible. The resulting visual impact would be negligible.

#### D. Consistency with Local Plans and Policies

This section provides a review of applicable plans and policies that affect development on YBI and relate to potential aesthetic effects associated with the proposed project.

Table 1: Project Consistency with Local Plans & Policies	
San Francisco General Plan	
The San Francisco General Plan was reviewed for policies that would apply to the proposed project and its potential aesthetic impacts. The following policies relate to aesthetic issues as applicable to the project:	
Environmental Protection Element	
<b>Policy 1.4:</b> Assure that all new development meets strict environmental quality standards and recognizes human needs.	<b>Alternative 2B:</b> This alternative would be inconsistent with Policy 1.4, given that the proposed ramps would have adverse visual impacts on people in the vicinity of the project site. <b>Alternative 4:</b> This alternative would be inconsistent with Policy 1.4, given that the proposed ramps would have adverse visual impacts on people in the vicinity of the project site. However, the ramp structures associated with this Alternative would be more extensive and visually intrusive than those of Alternative 2B.
<b>Policy 7.2:</b> Protect land from changes that would make it unsafe or unsightly.	<b>Alternative 2B:</b> This alternative would be inconsistent with Policy 7.2, given that the proposed ramps would have adverse visual impacts on the land in the vicinity of the project site. <b>Alternative 4:</b> This alternative would be inconsistent with Policy 7.2, given that the proposed ramps would have adverse visual impacts on the land in the vicinity of the project site. However, the ramp structures associated with this Alternative would be more extensive and visually intrusive than those of Alternative 2B.
Recreation and Open Space Element	
<b>Policy 2.3:</b> Preserve sunlight in public open spaces.	<b>Alternative 2B:</b> This alternative would be inconsistent with Policy 2.3, given that the proposed ramps would block sunlight in open spaces in the vicinity of the project site. <b>Alternative 4:</b> This alternative would be inconsistent with Policy 2.3, given that the proposed ramps would block sunlight in open spaces in the vicinity of the project site. However, the ramp structures associated with this Alternative would be more extensive and would block more sunlight than those of Alternative 2B.

Yerba Buena Island Ramps Improvement Project  
Visual Impact Assessment

**Table 1: Project Consistency with Local Plans & Policies**

Transportation ElementP	
Policy 2.3: Design and locate facilities to preserve the historic city fabric and the natural landscape, and to protect views.	<p><b>Alternative 2B:</b> This alternative would be inconsistent with Policy 2.3, given that the proposed ramps would have adverse visual impacts on historic structures and the natural landscape in the vicinity of the project site.</p> <p><b>Alternative 4:</b> This alternative would be inconsistent with Policy 2.3, given that the proposed ramps would have adverse visual impacts on historic structures and the natural landscape in the vicinity of the project site. However, the ramp structures associated with this Alternative would be more extensive and visually intrusive than those of Alternative 2B.</p>
Urban Design Element	
Policy 1.1: Recognize and protect major views in the city, with particular attention to those of open space and water.	<p><b>Alternative 2B:</b> This alternative would be inconsistent with Policy 1.1, given that the proposed ramps would have adverse visual impacts on views of open space and water in the vicinity of the project site.</p> <p><b>Alternative 4:</b> This alternative would be inconsistent with Policy 1.1, given that the proposed ramps would have adverse visual impacts on views of open space and water in the vicinity of the project site. However, the ramp structures associated with this Alternative would be more extensive and visually intrusive on views of open space and water than those of Alternative 2B.</p>
Policy 2.7: Recognize and protect outstanding and unique areas that contribute in an extraordinary degree to San Francisco's visual form and character.	<p><b>Alternative 2B:</b> The proposed ramp structures associated with this alternative would not conflict with Policy 2.7. Though the ramp structures would have adverse visual impacts on the project site and its vicinity, the ramps would not destroy unique areas that contribute in an extraordinary degree to San Francisco's visual form and character.</p> <p><b>Alternative 4:</b> The proposed ramp structures associated with this alternative would not conflict with Policy 2.7. Though the ramp structures would have adverse visual impacts on the project site and its vicinity, the ramps would not destroy unique areas that contribute in an extraordinary degree to San Francisco's visual form and character.</p>
Development Plan & Term Sheet for Redevelopment of Naval Station Treasure Island	
This Plan includes discussion about the need to reestablish the shorelines of Treasure Island and YBI as more publicly oriented features. These policies indicate a desire to orient activities toward areas of the islands that would have prominent views of the proposed YBI ramps.	
Page 53: Preserve and reinforce Yerba Buena Island's natural setting with a development carefully integrated to the site.	<p><b>Alternative 2B:</b> This alternative would be inconsistent with the Development Plan, given that the proposed ramps would have adverse visual impacts on the natural setting of YBI in the vicinity of the project site.</p> <p><b>Alternative 4:</b> This alternative would be inconsistent with the Development Plan, given that the proposed ramps would have adverse visual impacts on the natural setting of YBI in the vicinity of the project site. However, the ramp structures associated with this Alternative would be more extensive and visually intrusive on the natural setting than those of Alternative 2B.</p>
Page 53: Create a regional public park at the top of the island and set heights and placement of adjacent buildings to preserve major view panoramas and corridors to the Bay from the park.	<p><b>Alternative 2B:</b> The proposed ramp structures associated with this alternative would not conflict with this policy.</p> <p><b>Alternative 4:</b> The proposed ramp structures associated with this alternative would not conflict with this policy.</p>
Page 55: Design sculptural landforms, pathways, overlooks, and shoreline reinforcements to create a definitive and vibrant edge for the island.	<p><b>Alternative 2B:</b> The proposed ramp structures associated with this alternative would not conflict with this policy.</p> <p><b>Alternative 4:</b> The proposed ramp structures associated with this alternative would not conflict with this policy.</p>



Yerba Buena Island Ramps Improvement Project  
Visual Impact Assessment

**Table 1: Project Consistency with Local Plans & Policies**

**San Francisco Bay Conservation and Development Commission: San Francisco Bay Plan**

The Bay Conservation and Development Commission (BCDC), a state agency, adopted the San Francisco Bay Plan in 1968 and has subsequently amended its content. The Bay Plan was reviewed for policies that might affect the proposed project. The section concerning "Appearance, Design, and Scenic Views of Development around the Bay" is most relevant to the Visual Analysis of the project.

**Policy 4:** Structures and facilities that do not take advantage of or visually complement the Bay should be located and designed so as not to impact visually on the Bay and shoreline.

**Alternative 2B:** This alternative would be inconsistent with Policy 4, given that the proposed ramps would have adverse visual impacts on views toward the Bay from certain waterfront locations in the vicinity of the project site.

**Alternative 4:** This alternative would be inconsistent with Policy 4, given that the proposed ramps would have adverse visual impacts on views toward the Bay from certain locations in the vicinity of the project site. However, the ramp structures associated with this Alternative would be more extensive and visually intrusive than those of Alternative 2B.

**Policy 7:** Access routes to Bay crossings should be designed so as to orient the traveler to the Bay (as in the main approaches to the Golden Gate Bridge). Similar consideration should be given to the design of highway and mass transit routes paralleling the Bay (by providing frequent views of the Bay, if possible, so the traveler knows which way he or she is moving in relation to the Bay). Guardrails, fences, landscaping, and other structures related to such routes should be designed and located so as to maintain and to take advantage of Bay views. New or rebuilt roads in the hills above the Bay and in areas along the shores of the Bay should be constructed as scenic parkways in order to take full advantage of the commanding views of the Bay.

**Alternative 2B:** This alternative would be consistent with Policy 7. The ramps associated with this alternative would provide motorists good, though fleeting views of the Bay.

**Alternative 4:** This Alternative would be consistent with Policy 7. The ramps associated with this alternative would provide motorists good views of the Bay. These views would be observable for longer periods of time under this alternative, compared to views under Alternative 2B.

**Policy 14:** Views of the Bay from vista points and from roads should be maintained by appropriate arrangements and heights of all developments and landscaping between the view areas and the water. In this regard, particular attention should be given to all waterfront locations, areas below vista points, and areas along roads that provide good views of the Bay for travelers, particularly areas below roads coming over ridges and providing a "first view" of the Bay (shown in Bay Plan Map No. 8, Natural Resources of the Bay).

**Alternative 2B:** This alternative would be inconsistent with Policy 14, given that the proposed ramps would have adverse visual impacts on views toward the Bay from certain waterfront locations in the vicinity of the project site.

**Alternative 4:** This alternative would be inconsistent with Policy 14, given that the proposed ramps would have adverse visual impacts on views toward the Bay from certain locations in the vicinity of the project site. However, the ramp structures associated with this Alternative would be more extensive and visually intrusive than those of Alternative 2B.

## E. Summary of Project Impacts

The following table provides a concise description of the visual impacts associated with Alternative 2B and Alternative 4 for each viewpoint evaluated in this VIA. Visual quality impacts were discussed as they relate to visual dominance, view obstruction, community disruption/ orientation/privacy, and overall visual quality. Review of the overall visual quality column in the

table indicates that Alternative 2B would have a less adverse visual impact on the project area than Alternative 4.



Yerba Buena Island Ramps Improvement Project  
Visual Impact Assessment

**Table 2: Summary of Project Impacts – Alternative 2B**

	Visual Dominance of YBI Ramps	View Obstruction	Community Disruption/ Orientation / Privacy	Overall Visual Quality Impact
Viewpoint 1	Dominant	Partial	Negligible	Minimally Adverse
Viewpoint 2	Subordinate	Partial	Minimally Adverse	Minimally Adverse
Viewpoint 3	Dominant	Large	Adverse	Strongly Adverse
Viewpoint 4	Dominant	Partial	Adverse	Adverse
Viewpoint 5	Subordinate	Partial	Negligible	Negligible
Viewpoint 6	Subordinate	Partial	Negligible	Minimally Adverse
Viewpoint 7	In-evident	Partial	Negligible	Negligible
Viewpoint 8	Subordinate	Partial	Negligible	Negligible

**Table 3: Summary of Project Impacts – Alternative 4**

	Visual Dominance of YBI Ramps	View Obstruction	Community Disruption/ Orientation / Privacy	Overall Visual Quality Impact
Viewpoint 1	Co-dominant	Partial	Negligible	Minimally Adverse
Viewpoint 2	Co-dominant	Partial	Adverse	Adverse
Viewpoint 3	Co-dominant	Partial	Minimally Adverse	Minimally Adverse
Viewpoint 4	Dominant	Large	Strongly Adverse	Strongly Adverse
Viewpoint 5	Co-dominant	Partial	Adverse	Adverse
Viewpoint 6	Co-dominant	Partial	Adverse	Adverse
Viewpoint 7	In-evident	Partial	Negligible	Negligible
Viewpoint 8	Subordinate	Partial	Negligible	Negligible

## F. Cumulative Impacts

The area surrounding the proposed project will undergo change during the coming years due to construction of the SFOBB East Span project, which will be a visually prominent project in the area. Development associated with the SFOBB will contribute to the changing character of the landscape. The SFOBB project would generally have the effect of reducing the impact of the proposed YBI ramps, with the former being considerably more visually prominent from various viewpoints than the latter. However, in some instances, the YBI Ramps Project's contribution to changes to the area-wide visual setting would be equal to changes attributable to the SFOBB project. In general, ramp features associated with Alternative 2B would have a lesser cumulative impact on the area's visual setting than the ramp features associated with Alternative 4.

## VII. VISUAL MITIGATION

Caltrans and the FHWA mandate that a qualitative/aesthetic approach should be taken to mitigate for visual quality loss in the project area. This approach fulfills the letter and the spirit of FHWA requirements because it addresses the actual cumulative loss of visual quality that would occur in the project viewshed if the project is implemented. It also constitutes mitigation that can more readily generate public acceptance of the project.

## Yerba Buena Island Ramps Improvement Project Visual Impact Assessment

Visual mitigation for adverse project impacts addressed in the key viewpoint assessments and summarized in the previous section will consist of adhering to the following design requirements in cooperation with the District Landscape Architect.

### **Alternative 2B**

Construction of the Alternative 2B design would in some cases have adverse impacts on the visual quality of some areas when these areas are observed from certain viewpoints. This would occur most dramatically in cases where views toward or from the Senior Officers' Quarters Historic District would be dominated and/or obstructed by the ramp structures.

This alternative would require the removal of woodland vegetation, mostly mature eucalyptus trees, within the project's construction limits. Most of the trees that would be removed are located in the area southwest of the Nimitz House, which is where the off-ramp would end and the on-ramp would begin. The height of these mature trees is dramatic; they soften the island's appearance and contribute to pleasant views on the island. The removal of this vegetation would constitute a substantial visual impact, and a number of years would be required before the vegetation could reestablish itself to the density that exists today.

Design requirements that promote a softening of the visual environment in the wake of the new YBI ramps will be implemented. If this alternative is implemented, vegetation removed during construction will be replaced, to the extent feasible, in areas that will aesthetically enhance the project site, and new vegetation will be planted in appropriate locations elsewhere on site. However, given the large scale of the ramps, it would not be feasible to screen or sufficiently offset their visual effects without in the process causing secondary negative visual effects.

In order to promote a seamless interaction between the ramps and the SFOBB Transition Structure, the ramps will utilize a ribbed design that is consistent with the structural form and architectural vocabulary of the new SFOBB East Span.

### **Alternative 4**

Implementation of Alternative 4 would require less vegetation removal than Alternative 2B. However, the sheer mass and extent of the design would produce an overall more visually dominant effect relative to Alternative 2B. If Alternative 4 is implemented, design requirements that promote a softening of the visual environment after ramp construction will be followed. However, given the large scale of the ramps, it would not be feasible to screen or sufficiently offset their visual effects without in the process causing secondary negative visual effects.

In order to further mitigate the visual impact of the ramp structures associated with this alternative, the use of a ribbed design such as the one presented for Alternative 2B shall be implemented.

## VIII. LIST OF PREPARERS

California Department of Transportation - District 4  
111 Grand Avenue  
Oakland, California 94612

Clive Endress, Landscape Architect

EDAW AECOM  
150 Chestnut Street  
San Francisco, California 94111

Bill Graham, Principal  
Tammy Chan, Project Manager  
Susan Yogi, Assistant Project Manager  
Rudy Calderon, Environmental Planner  
Shawn Jackson, Visual Simulations  
Lynn Frederico, GIS Specialist  
Jeffrey Barr, Landscape Architect  
Garrett Avery, Landscape Designer  
Amber Giffin, Word Processing  
Debbie Jew, Word Processing

## IX. REFERENCES

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Yerba Buena Island Ramps Improvement Project  
Visual Impact Assessment

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## **APPENDIX J**

**YBI HPSR, HRER, and FOE**



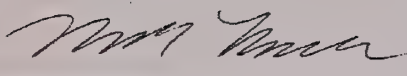


**FIRST SUPPLEMENTAL HISTORIC PROPERTY SURVEY REPORT  
YERBA BUENA ISLAND RAMPS IMPROVEMENT PROJECT  
YERBA BUENA ISLAND, SAN FRANCISCO COUNTY, CALIFORNIA  
04-SF-80-PM 7.6/8.1**

**EA 04-3A640K**

Prepared by:

**AECOM  
2020 L Street, Suite 400  
Sacramento, California 95811  
(916) 414-5800  
February 4, 2011**

Prepared By: 

Mark Bowen, Senior Historian/Architectural Historian

Date

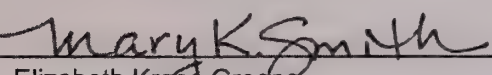
Prepared For:

**Eric Cordoba, Project Manager  
SFCTA  
100 Van Ness Avenue, 26<sup>th</sup> Floor  
San Francisco, CA 94102**

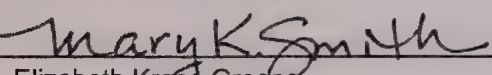
Approved By: 

**Janet Pape, Branch Chief, SFOBB Archaeology  
PQS Prehistoric Archaeology, Lead; Historical Archaeology, Co-PI  
Office of Cultural Resources Studies  
Caltrans District 4  
111 Grand Avenue, P.O. Box 23660  
Oakland, California, 94623**

  
Date

Approved By: 

**for: Elizabeth Krass Greene  
Branch Chief, South Counties  
Office of Cultural Resources Studies  
Caltrans District 4  
111 Grand Avenue, P. O. Box 23660  
Oakland, CA 94623**

  
02/04/11.  
Date

**February 2011**





**SUPPLEMENTAL HISTORIC PROPERTY SURVEY REPORT****1. UNDERTAKING DESCRIPTION AND LOCATION**

District	County	Route	Post Miles	Unit	E-FIS Project Number	Phase
04	SF	I-80	7.8-8.1 (KP)	L1C0	04-0002-0507 EA 3A640	0
District	County	Funding Source	Federal-Aid Proj. No.	Location	E-FIS Proj. No	Phase

*For Local Assistance projects off the highway system, use headers in italics)*

**Project Description:**

Yerba Buena Island (YBI) is located in the San Francisco Bay approximately halfway between Oakland and San Francisco. YBI is only accessible to vehicular traffic via the San Francisco Oakland Bay Bridge (SFOBB) stretch of I-80. The SFOBB is considered a critical link between the East Bay and San Francisco. It provides the only vehicle access to YBI, the active U.S. Coast Guard (USCG) facilities located on the south side of the island, and Treasure Island, located immediately north of YBI.

The proposed project would replace the existing westbound on- and off-ramps located on the east side of YBI with new westbound on- and off-ramps. The new ramps would maintain the functional role of the current ramps while satisfying seismic requirements, highway design standards, traffic operations, and improve safety. The YBI Ramps Improvement Project is independent of both the SFOBB East Span Seismic Safety Project (under FHWA/Caltrans), currently under construction, and the Treasure Island and Yerba Buena Island (TI/YBI) Redevelopment Plan (under County/City of San Francisco, and TIDA), currently undergoing its own environmental review process.

The purpose of the project is to improve the safety of the westbound on- and off-ramps to the extent physically and economically feasible. The current ramps do not meet current federal design standards. The proposed project would provide standard deceleration length for the off-ramp and improved acceleration/merging length for the on-ramp. In addition, the project would improve traffic operations to and from YBI.

Build alternatives have been proposed to address the geometric and operational deficiencies of the existing on- and off-ramps and their effects on the SFOBB (I 80) mainline without degrading the mainline operation as compared to no action. The proposed project is located between post-mile (PM) 7.6 and 8.1 beginning at the east portal of the YBI tunnel and ending at the east end of the Transition Structure portion of the new SFOBB. The SFOBB Transition Structure is located between PM 7.9 and 8.1 between the YBI tunnel and the SFOBB Self-Anchored Suspension (SAS) span.<sup>1</sup>

In 2009, AECOM prepared an HPSR for the project described above. The 2009 HPSR assessed cultural resources in the project area for NRHP and CRHR eligibility. Five properties were identified as eligible or listed in the NRHP or the CRHR. These included:

- CA-SFr-04/H DOE 8/13/1998
- Quarters 8 DOE September 1998
- Quarters 10 (and contributing Building 267) Listed 2/26/08
- The Senior Officers Historic District Listed 2/26/2008
- San Francisco Oakland Bay Bridge Listed 8/13/01

<sup>1</sup> The SFOBB Transition Structure is the section of the new bridge located between the west end of the Self-Anchored Suspension (SAS) span and the east end of the SFOBB viaduct on Yerba Buena Island. It allows bridge traffic to transition between the single-deck SAS span and the double-deck viaduct prior to entering, or after exiting the YBI tunnel.

For the federal undertaking described in Part 1: To minimize redundancy and paperwork for the California Department of Transportation and the State Historic Preservation Officer, and in the spirit intended under the federal Paperwork Reduction Act (U.S.C. 44 Chapter 35), this document also satisfies consideration under California Environmental Quality Act Guidelines Section §15064.5(a) and, as appropriate, Public Resources Code §5024 (a)(b) and (d).

**SUPPLEMENTAL HISTORIC PROPERTY SURVEY REPORT**

The proposed project was also found to adversely affect historic resources. The State Historic Preservation Officer (SHPO) concurred with the report findings of eligibility and effects in a letter dated February 8, 2010 (Attachment D). A draft MOA has been prepared that contains mitigation stipulations to address the adverse effect caused by the project. The proposed mitigation includes relocation of Quarters 10 and Building 267 (under Alternative 2b) to either of two possible sites on Yerba Buena Island. As a result, two discontinuous APEs were established and this supplemental HPSR has been prepared to address any properties or resources that may be present.

Three alternatives are currently under consideration for the proposed project and presented in the DEIR/DEIS, Alternatives 2b, Alternative 4, and the No Action Alternative. However, only one alternative (Alternative 2b) would require the removal of Quarters 10 and Building 267. Information on the alternatives and their effects on historic properties can be found in the HPSR (2009) and FOE (2009). This HPSR addresses only the supplemental APEs.

- **Alternative 2b**

Alternative 2b would include removal of the existing westbound on- and off-ramps on the east side of YBI, construction of a westbound loop on-ramp from Macalla Road on the east side of YBI, and construction of a westbound off-ramp to Macalla Road on the east side of YBI.

Under Alternative 2B, the westbound on- and off-ramps would terminate at Macalla Road where Quarters 10 and Building 267 are currently located.<sup>2</sup> Per MOA Quarters 10 and Building 267 would be relocated prior to construction of the ramps at Macalla Road.

Two building relocation sites on YBI (Building Move Site #1 and Building Move Site #2) have been proposed as potential locations for Quarters 10 and Building 267.

The California Department of Transportation (Caltrans), acting as the lead agency under the delegated authority of the Federal Highway Administration, is providing the project oversight as federal funds are involved. Caltrans' oversight is intended to ensure that this undertaking is carried out in a manner consistent with Caltrans' responsibilities under the January 2004 *Programmatic Agreement among the Federal Highway Administration, the Advisory Council on Historic Preservation, the California State Historic Preservation Officer, and the California Department of Transportation Regarding Compliance with Section 106 of the National Historic Preservation Act, as it Pertains to the Administration of the Federal-Aid Highway Program in California*.

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<sup>2</sup> Quarters 10 and Building 267 (a contributing garage) are listed in the National Register of Historic Places and significant at the local level under Criterion C, as a significant example of mid-twentieth century residential architecture.

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For the federal undertaking described in Part 1: To minimize redundancy and paperwork for the California Department of Transportation and the State Historic Preservation Officer, and in the spirit intended under the federal Paperwork Reduction Act (U.S.C. 44 Chapter 35), this document also satisfies consideration under California Environmental Quality Act Guidelines Section §15064.5(a) and, as appropriate, Public Resources Code §5024 (a)(b) and (d).



**SUPPLEMENTAL HISTORIC PROPERTY SURVEY REPORT****2. AREA OF POTENTIAL EFFECTS**

The initial Area of Potential Effects (APE) for the project was established in consultation with Janet Pape, Caltrans District 4 Archaeologist, Mary K. Smith, Caltrans District 4 Architectural Historian, and Jack Siau, Project Manager/Local Assistance Engineer, on 10/21/08, 10/23/08, and 10/24/08. These maps are appended to the 2008 Historic Property Survey Report. The Supplemental APE maps are described below.

The Supplemental APE was established based upon information provided by AECOM project engineers regarding: 1) the anticipated location of the buildings on the two potential relocation sites; and 2) the process for relocating the buildings from their current location to either relocation site. The existing paved roads would be used to transport the buildings. For the purposes of this analysis, it is assumed that relocation would require partial dismantling of the structures. This approach would allow relocation without the need to create new paths of travel or otherwise cause ground disturbance beyond the areas where reconstruction would occur. Project engineers were asked to define the area within which construction activities would occur for each of the relocation sites. The boundaries shown on the APE map correspond to the area defined by the project engineers, inclusive of staging areas.

The revised discontinuous APE consists of two separate parcels (each less than 1 acre). These consist of Building Move Site #1 located near the south end of the isthmus that connects Treasure Island and Yerba Buena Island and Building Move Site #2 located on the upper elevation of Yerba Buena Island on Yerba Buena Drive. These two parcels are intended for the relocation of two related historic buildings associated with the U.S. Naval Station Treasure Island that would be adversely affected under an Alternative of the Project. In order to mitigate the adverse effects, it has been proposed that Quarters 10 and associated Building 267 (garage) be moved to one of the two potential sites.

The supplemental archaeological APE (Map 2a) was established as generally following the maximum possible area of direct impact resulting from the relocation of Quarters 10 and Building 267, including all necessary construction, easements, and staging areas.

Consistent with Caltrans policies and general cultural resource practices, the area for potential effect for the built environment encompassed areas that might be either directly or indirectly affected by construction; i.e., those areas within which the project could cause a change in character or use of historic properties. In setting the APE for this supplemental study, consideration was given to the potential for visual effects by placing Quarters 10/267 at either Building Move Site. The only historic properties in the viewshed of Building Move Site #1 are Exposition Buildings 1, 2, and 3 on Treasure Island, which are at least 1,300 feet away from this site. The principal view from Expo Building 1 is to the west toward San Francisco, and views from the front courtyard, entry driveway and main entrance toward Building Move Site #1 are all blocked by the curving south wing of the building. Expo Buildings 2 and 3 were built as airplane hangars facing west toward San Francisco. Views to the south toward Building Move Site #1 would be similar to the current condition, with the site screened by shrubbery and trees. There are no historic properties in the vicinity of Building Move Site #2. Only those resources located within the architectural APE were included in the survey.

The supplemental APE for historic architectural resources includes two areas building relocation sites, including all necessary construction, easements, and staging areas (Map 2b).

**3. CONSULTING PARTIES / PUBLIC PARTICIPATION****X** Local Government (*Head of local government, Preservation Office / Planning Department*)

On January 18, 2011, AECOM sent letters to the local government agencies listed below. As of the date of this supplemental report no responses were received. Copies of the letters are provided in Appendix B of the ASR.

- San Francisco Historic Preservation Commission
- San Francisco Planning Department
- San Francisco County Transportation Authority

For the federal undertaking described in Part 1: To minimize redundancy and paperwork for the California Department of Transportation and the State Historic Preservation Officer, and in the spirit intended under the federal Paperwork Reduction Act (U.S.C. 44 Chapter 35), this document also satisfies consideration under California Environmental Quality Act Guidelines Section §15064.5(a) and, as appropriate, Public Resources Code §5024 (a)(b) and (d).



**SUPPLEMENTAL HISTORIC PROPERTY SURVEY REPORT****X** Native American Tribes, Groups and Individuals

On January 20, 2011, AECOM sent updated letters to the tribes, groups and individuals listed below. Phone calls were made on February 2, 2011. As of the date of this report no responses were received. Copies of the letters are provided in Appendix B of the ASR.

- Jakki Kehl
- Amah/Matsun Tribal Band
- Indian Canyon Band of Costanoan
- Muwekma Ohlone Indian Tribe of the SF Bay Area
- The Ohlone Indian Tribe
- Trina Marine Ruano Family

On February 3, 2011, AECOM received the updated NAHC response which included two additional contacts from that of the 2008 response:

- Linda G. Yamane
- Jean-Marie Feyling

Emails were sent to both contacts and supplemented with hardcopy letters. Copies of the emails/letters are provided in Appendix B of the ASR.

**X** Native American Heritage Commission

- Updated request for search of files: January 18, 2011. Response received February 3, 2011.

**X** Local Historical Society / Historic Preservation Group *(also if applicable, city archives, etc.)*

On January 18, 2011, AECOM sent letters to the organizations listed below. As of the date of this supplemental report one response has been received via email from BRAC PMO West with a request to receive a draft of this HPSR.

Copies of the letters are provided in Appendix B of the ASR.

- Alameda County Historical Society.
- Alameda County Parks, Recreation, and Historical Commission
- BRAC PMO West
- California Heritage Council
- California Historical Society
- California Preservation Foundation
- National Park Service, Pacific West Region Office
- National Trust for Historic Preservation Western Office
- Oakland Cultural Heritage Survey
- Oakland Heritage Alliance
- Oakland Landmarks Preservation Advisory Board
- San Francisco Architectural Heritage
- San Francisco Beautiful
- San Francisco History Association
- San Francisco Museum and Historical Society
- USCG Sector San Francisco, Engineering Department

**X** Public Information Meetings *(list locations, dates below and attach copies of notices)*

- Public Scoping Meeting. Location: Port of San Francisco office, Bayside Conference Room. Pier 1, The Embarcadero, San Francisco, CA 94111. Date: September 24, 2008 from 6:30 to 8:00 p.m.

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For the federal undertaking described in Part 1: To minimize redundancy and paperwork for the California Department of Transportation and the State Historic Preservation Officer, and in the spirit intended under the federal Paperwork Reduction Act (U.S.C. 44 Chapter 35), this document also satisfies consideration under California Environmental Quality Act Guidelines Section §15064.5(a) and, as appropriate, Public Resources Code §5024 (a)(b) and (d).

## SUPPLEMENTAL HISTORIC PROPERTY SURVEY REPORT

- Coordination plan letters sent out on September 18, 2008.
- Public hearing (anticipated) March 2011.

Other

### 4. SUMMARY OF IDENTIFICATION EFFORTS

- |   |  |
|---|--|
| <ul style="list-style-type: none"> <li><input checked="" type="checkbox"/> National Register of Historic Places</li> <li><input checked="" type="checkbox"/> California Register of Historical Resources</li> <li><input checked="" type="checkbox"/> California Inventory of Historic Resources</li> <li><input checked="" type="checkbox"/> California Historical Landmarks</li> <li><input checked="" type="checkbox"/> California Points of Historical Interest</li> <li><input type="checkbox"/> State Historic Resources Commission</li> <li><input checked="" type="checkbox"/> Caltrans Historic Highway Bridge Inventory</li> <li><input checked="" type="checkbox"/> Archaeological Site Records [<i>List names of Institutions &amp; date below</i>]</li> <li> <ul style="list-style-type: none"> <li>• Northwest Information Center, records search on November 24, 2008.</li> <li>• An update to the existing records search conducted at the Northwest Information Center on January 18, 2011.</li> </ul> </li> <li><input type="checkbox"/> Other sources consulted [<i>e.g., historical societies, city archives, etc. List names and dates below</i>]</li> </ul> | <ul style="list-style-type: none"> <li>Month &amp; Year: 1979-2002 &amp; supplements</li> <li>Year: 1992 &amp; supplemental information to date</li> <li>Year: 1976</li> <li>Year: 1995 &amp; supplemental information to date</li> <li>Year: 1992 &amp; supplemental information to date</li> <li>Year: 1980-present, minutes from quarterly meetings</li> <li>Year: 2006 &amp; supplemental information to date</li> </ul> |
|---|--|

☒ **Results:** (*provide a brief summary of records search and research results, as well as inventory findings*)

This HPSR is focused upon two supplemental sites that have been added to the project APE since 2008. In 2008, the NWIC record search demonstrated that a total of 23 cultural resources investigations have been conducted within and in the vicinity (approximately 1 mile radius) of the initial project APE. Prior to the efforts outlined in the supplemental Historic Property Survey Report, there were at least 8 studies that have occurred directly within the Yerba Buena Island Ramps Improvement Project APE; the earliest documented investigations conducted within the vicinity of the initial project area APE consist of Rudo (1982) and Roop (1984). With the exception of Rudo's thesis, each of these prior studies was related to Caltrans' seismic retrofit of the Bay Bridge and the Navy's privatization efforts regarding Yerba Buena Island.

The majority of the 8 studies conducted within the Yerba Buena Island Ramps Improvement Project Initial APE consisted primarily of archaeological investigations and treatment plans. Almost the entire initial APE was subjected to complete survey coverage by PAR in 1996. A large portion of the initial APE was also previously surveyed in 1995 by Glenn Gmoser. These previous studies revealed that one archaeological site, CA-SFR-04/H, had been recorded within the initial YBI APE. One historical archaeological resource, P-38-004322, which consists of sections of a retaining wall and weir with inscriptions by prisoners-of-war who built it in the 1940s, is located outside the initial APE. This resource was evaluated to be ineligible for inclusion in the National Register (Supernowicz 2003). See 2009 ASR for Archaeological site record citations.

With regards to the two supplemental APE sites that are the subject of this HPSR, at least two previous cultural studies provided full coverage. These included the aforementioned 1996 PAR analysis and a research design conducted in 2003 by Southwest Division, Naval Facilities Engineering. No prehistoric or historic-era sites, features, artifacts, buildings, or structures were identified within or in the immediate vicinity of the Building Move sites by either the PAR investigation or the Southwest Division, Naval Facilities Engineering report. The 2011 records search yielded no additional no additional prehistoric or

For the federal undertaking described in Part 1: To minimize redundancy and paperwork for the California Department of Transportation and the State Historic Preservation Officer, and in the spirit intended under the federal Paperwork Reduction Act (U.S.C. 44 Chapter 35), this document also satisfies consideration under California Environmental Quality Act Guidelines Section §15064.5(a) and, as appropriate, Public Resources Code §5024 (a)(b) and (d).

**SUPPLEMENTAL HISTORIC PROPERTY SURVEY REPORT**

historic-era sites, features, artifacts, buildings, or structures within or in the immediate vicinity of the Building Move Sites. A third architectural study was completed by JRP in 1997 and covered the two supplemental APE sites. The results of which are described in the next section.

A supplemental archaeological field survey was conducted in January 2011 as part of the supplemental ASR (2011).

**5. PROPERTIES IDENTIFIED**

☒ Properties **previously determined not eligible** for inclusion in the National Register of Historic Places are present within the Project APE. *(Include date of determination):*

- Building 60
- Building 61

JRP Historical Consulting, LLC (JRP) previously identified and evaluated these resources in 1997 as part of the report entitled "Cultural Resources Inventory and Evaluation Investigations: Yerba Buena Island and Treasure Island Naval Station Treasure Island, San Francisco, California." That report, completed as part of the U.S. Navy's Base Realignment and Closure (BRAC) Section 106 requirements, concluded that neither of these two buildings met eligibility criteria. SHPO concurred with the findings of the JRP report, as it pertained to Buildings 60 and 61, on October 15, 1997 (SHPO Reference USN 970708A). On January 19, 2011 AECOM architectural historian Mark Bowen examined Buildings 60 and 61 and found that the conditions of the previous analysis remained valid.

**6. LIST OF ATTACHED DOCUMENTATION**

- ☒ Project Vicinity, Location, and APE Maps (Attachment A)
- ☒ First Supplemental Archaeological Survey Report (ASR)
- AECOM, February 2011, prepared by Brian Ludwig and Charlane Gross; peer reviewed by Janet Pape, Caltrans, PQS Prehistoric Archaeology, Lead; Historical Archaeology, Co PI (Attachment C)
- ☒ DPR recordation Forms for Building 60 and Building 61 and Table 3.2 from 1997 JRP report. (Attachment B)
- ☒ SHPO Correspondence. (Attachment D)

**7. HPSR to File**

- ☒ **No properties requiring evaluation** are present within the Supplemental Project APE.

**8. HPSR to SHPO**

- ☒ Not applicable.

**9. Findings for State-Owned Properties**

- ☒ Caltrans has determined that there are **no State-owned cultural resources** within the Supplemental Project APE.

**10. CEQA IMPACT FINDINGS**

- ☒ Not applicable; Caltrans is not the lead agency under CEQA.



**SUPPLEMENTAL HISTORIC PROPERTY SURVEY REPORT****11. SUPPLEMENTAL HPSR PREPARATION AND DEPARTMENT APPROVAL**

Prepared by: (sign on line)



2/04/2011

Consultant / discipline:

Mark Bowen, Architectural Historian

Date

Affiliation

AECOM, Sacramento, CA

Reviewed for approval by: (sign on line)



2/4/11

District 4 Caltrans PQS  
discipline/level:Janet Pape, Branch Chief, SFOBB  
Archaeology

Date

PQS Prehistoric Archaeology, Lead; Historical  
Archaeology, Co-PI  
Office of Cultural Resource Studies  
Caltrans District 4

Approved by: (sign on line)



02/04/11.

District 4 EBC:for: Elizabeth Krase Greene Branch Chief, South  
Counties

Date

PQS Principal Architectural Historian  
Office of Cultural Resource Studies  
Caltrans District 4



# **ATTACHMENT A**

---

Maps





Map 1:  
Project Vicinity and Location

Yerba Buena Island  
Ramps Improvement Project



Portion of USGS topographic quadrangles  
Oakland West and San Francisco North

Project Location
  Supplemental Project Area
  Transition Structure Portion of SFOBB

0 0.25 0.5 Miles





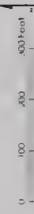
Map 2a: Supplemental Archeological APE (Alternative 2b)

Yerba Buena Island  
Ramps Improvement Project



- Alternative 2b Proposed Ramps**
- Proposed West Bound On Ramp
  - Proposed East Bound On Ramp
  - Proposed Masses Board Improvements
- Separate Project Currently Under Construction**
- San Francisco-Oakland Bay Bridge
  - East Span Seismic Safety Project
  - ☒ Transition Structure Portion of SFOBB
- Area of Potential Effect Signed October 24, 2008**
- Area of Potential Effect Signed October 24, 2008
  - Supplemental Area of Potential Effect

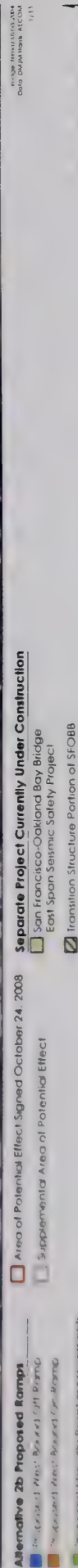
Project Name/UGS/2004  
Date/Description/ACOM  
1/11



	2/1/11	Date
David Pope	11/3/11	Date
David Pope	2/2/11	Date



# Yerba Buena Island Ramps Improvement Project







## **ATTACHMENT B**

---

Forms





State of California — The Resources Agency  
DEPARTMENT OF PARKS AND RECREATION  
**PRIMARY RECORD**

Primary # \_\_\_\_\_  
HRI # \_\_\_\_\_  
Trinomial \_\_\_\_\_  
NRHP Status Code \_\_\_\_\_

Other Listings \_\_\_\_\_  
Review Code \_\_\_\_\_ Reviewer \_\_\_\_\_ Date \_\_\_\_\_

Page 1 of 4

\*Resource Name or #: (Assigned by recorder) Building 60

P1. Other Identifier: Officer's Quarters

\*P2. Location: ☐ Not for Publication ☒ Unrestricted \*a. County San Francisco  
and P2c, P2e, and P2b or P2d. (Attach Location Map as necessary.)

\*b. USGS 7.5' Quad Oakland West Date 1980 T\_\_\_\_; R\_\_\_\_: \_\_\_\_% of \_\_\_\_% of Sec \_\_\_\_; \_\_\_\_ B.M.

c. Address Naval Station, Treasure Island City San Francisco Zip 94592-5100

d. UTM: (Give more than one for large and/or linear resources) Zone: \_\_\_\_\_; \_\_\_\_\_ mE/ \_\_\_\_\_ mN

\*e. Other Locational Data: (E.g., parcel #, directions to resource, elevation, etc., as appropriate.)

\*P3a. Description: (Describe resource and its major elements. Include design, materials, condition, alterations, size, setting, and boundaries.)

Building 60 is a woodframe duplex residence, with a side gabled roof and front gable ells. The cross gable roofs that extend with the short ell wings add some variation to the main long side gable body of the building. Some additional projecting elements are seen in the form of the house: A small gabled porch at the east end, a small shed-roofed stairway on the side near the west end, and an enclosed solarium at the center of the rear (south) side. See Photograph 2. (See continuation sheet.)

\*P3b. Resource Attributes: (See attributes and codes) HP34 Military Property: HP3 Multiple Family Property

\*P4. Resources Present: ☒ Building ☐ Structure ☐ Object ☐ Site ☐ District ☐ Element of District ☐ Other (Isolates, etc.)

P5a. Photo or Drawing (Photo required for buildings, structures, and objects.)



P5b. Description of Photo:

(View, date, accession #) \_\_\_\_\_

East side, camera facing  
southwest.

\*P6. Date Constructed / Age and

Sources: ☒ Historic

☐ Prehistoric ☐ Both

1917

\*P7. Owner and Address:

Naval Station

Treasure Island

San Francisco, CA 94130

\*P8. Recorded by: (Name,  
affiliation, and address)

Janice Calpo

JRP Historical Consulting

1477 Drew Ave., Suite 105

Davis, CA 95616

\*P9. Date Recorded: 12/12/96

\*P10. Survey Type: (Describe)  
Intensive

\*P11. Report Citation: (Cite Survey report and other sources, or enter "none.") Historical Study of Yerba Buena Island,

Treasure Island, and Their Buildings

\*Attachments: ☐ Location Map ☒ Sketch Map ☒ Continuation Sheet ☒ Building,  
Structure, and Object Record ☐ Linear Resource Record ☐ Archaeological Record ☐ District Record ☐ Milling Station  
Record ☐ Rock Art Record ☐ Artifact Record ☐ Photograph Record ☐ Other (List) \_\_\_\_\_

**BUILDING, STRUCTURE, AND OBJECT RECORD**

Page 2 of 4

\*NRPH Status Code \_\_\_\_\_

\*Resource Name or # (Assigned by recorder) Building 60

- B1. Historic Name: Isolation Ward  
B2. Common Name: Building 61, Officer's Quarters  
B3. Original Use: Isolation Ward B4. Present Use: Officer's Quarters  
\*B5. Architectural Style: Bungalow  
\*B6. Construction History: (Construction date, alterations, and date of alternations.)  
Built 1917. 1917-1929 -- Isolation ward. 1929-1945 -- Quarters. 1945-1952 -- Civilian quarters. 1952-  
Present -- Officer's quarters.

- \*B7. Moved? ☒ No ☐ Yes ☐ Unknown Date: \_\_\_\_\_ Original Location: \_\_\_\_\_  
\*B8. Related Features: \_\_\_\_\_

- B9a. Architect: Bureau of Yards and Docks B9b. Builder: Bureau of Yards and Docks  
\*B10. Significance: Theme Naval Station Area Yerba Buena Island, San Francisco  
Period of Significance 1917-1947 Property Type Building Applicable Criteria n/a  
(Discuss importance in terms of historical or architectural context as defined by theme, period, and geographic scope. Also address integrity.)

Building 60 does not appear to be eligible for listing in the National Register because it is not significant. While it retains a fair degree of integrity, the building is not significant architecturally and does not appear to be associated with events or persons important within the context of the Navy operations at Yerba Buena Island.

Buildings 60, along with nearby Buildings 61 and 62 were built on the western slope of Yerba Buena Island in 1917 as isolation wards. While little is known about the history of the buildings, it is presumed they were used to house enlisted personnel with communicable diseases. All hospital-related functions were clustered in this area, and were built in the period, 1917-1919, when the Naval Training Station on Yerba Buena Island experienced a massive build-up as part of the general naval preparedness program. The hospital, or dispensary, was situated on Yerba Buena Road, in a site that is now vacant. Buildings 60, 61, and 62 were used for their intended purposes only for a brief time. (See continuation sheet.)

- B11. Additional Resource Attributes: (List attributes and codes): HP34 Military Property

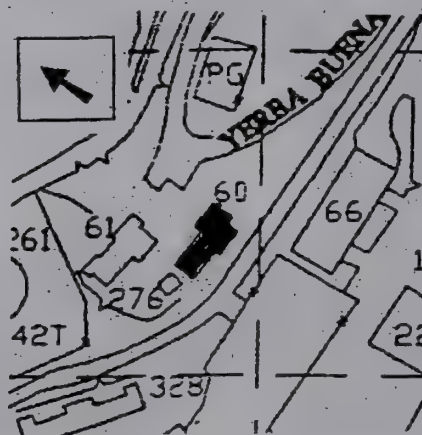
- \*B12. References: Historical Study of Yerba Buena Island, Treasure Island, and their Buildings, prepared by Mare Island Naval Shipyard Base Realignment and Closure (BRAC)

- B13. Remarks: \_\_\_\_\_

- \*B14. Evaluator: Stephen D. Mikesell  
\*Date of Evaluation: January 1997

(This space reserved for official comments.)

(Sketch Map with north arrow required.)



\*Required Information



**DESCRIPTION (continued)**

A boxed bay with hipped roof extends from the south side cross gable end. A small gabled room extends out from the west end of the house. Details can be found to place the house in the Craftsman era during which it was built: Knee braces are placed under the gable end eaves and a post and beam style bracing supports the east end porch gable.

The house is sheathed in drop siding and roofed in composition shingles. Vertical window openings contain aluminum sash 1/1 double hung windows that are the same size replacement for original 1/1 double hung wooden sash windows. Original doors have six-light fixed window panes. A small woodframe workshop, coordinated with the house in roof pitch and siding, sits just to the north of the house across a pathway. See **Photo 3**. The workshop has six-pane fixed windows.

**SIGNIFICANCE (continued)**

The Naval Training Station program on the island was reduced dramatically in 1919 and the station was closed in 1923. In 1920, the three buildings were re-used as quarters, initially for civilian employees of the base. The re-use required a relatively minor rehabilitation of the buildings. Although no historic photographs were found for Building 60, historic views of Building 61 (which is very similar) indicate that the re-use was accomplished with few structural or architectural changes. In the years since 1920, the building has been upgraded on several occasions; these more recent upgrade account for the notable changes to the building, including installation of aluminum windows and installation of a glazed bay at the rear.

Building 60 does not appear to be significant within the context of the history of the island. It was used as an isolation ward for a very short period of time. It has since been used as quarters for civilian employees and later as officers' quarters. It does not appear to be important in any of its three uses (isolation ward, civilian quarters, or officers' quarters). In the first respect, the use was too brief to constitute significance. In terms of civilian quarters, that context is far better represented by Quarters 9, an architecturally significant building that was actually constructed for that purpose. Within the context of officers' quarters, the building is far less important than Quarters 1-8, all of which are architecturally significant and which were built for that purpose. Lacking significance, Building 60 does not meet the criteria for listing in the National Register.



State of California — The Resources Agency  
DEPARTMENT OF PARKS AND RECREATION  
CONTINUATION SHEET

Primary # \_\_\_\_\_  
HRI# \_\_\_\_\_

Page 4 of 4

\*NRPH Status Code \_\_\_\_\_

\*Resource Name or # (Assigned by recorder) Building 60



Photo 2. Rear of Building 60.



Photo 3. Utility building at north end of building 60.

\*Required Information

PRIMARY RECORD

Primary # \_\_\_\_\_

HRI # \_\_\_\_\_

Trinomial \_\_\_\_\_

NRHP Status Code \_\_\_\_\_

Other Listings \_\_\_\_\_

Review Code \_\_\_\_\_

Reviewer \_\_\_\_\_

Date \_\_\_\_\_

Page 1 of 4

\*Resource Name or #: (Assigned by recorder) Building 61

P1. Other Identifier: Officers' Quarters

\*P2. Location: ☐ Not for Publication ☒ Unrestricted \*a. County San Francisco

and P2c, P2e, and P2b or P2d. (Attach Location Map as necessary.)

\*b. USGS 7.5' Quad Oakland West Date 1980 T: \_\_\_\_\_; R: \_\_\_\_\_ ¼ of \_\_\_\_\_ ¼ of Sec \_\_\_\_\_; \_\_\_\_\_ B.M.

c. Address Naval Station, Treasure Island City San Francisco Zip 94592-5100

d. UTM: (Give more than one for large and/or linear resources) Zone: \_\_\_\_\_; \_\_\_\_\_ mE/ \_\_\_\_\_ mN

\*e. Other Locational Data: (E.g., parcel #, directions to resource, elevation, etc., as appropriate.)

\*P3a. Description: (Describe resource and its major elements. Include design, materials, condition, alterations, size, setting, and boundaries.)

Building 61 is a woodframe, gable-roofed residence built at this site in 1917. It and nearby Buildings 60 and 62 were built as "isolation wards" on the western slope of Yerba Buena Island, near the location of the 1917 dispensary building (the early dispensary building was demolished in the mid-1930s). These three buildings were built as "isolation wards," presumably to house enlisted personnel with communicable diseases. The three buildings were very similar upon construction but have very different appearances today, owing to modifications associated with their re-use as single family residences. (See continuation sheet.)

\*P3b. Resource Attributes: (See attributes and codes) HP34 Military Property; HP2 Single Family Property

\*P4. Resources Present: ☒ Building ☐ Structure ☐ Object ☐ Site ☐ District ☐ Element of District ☐ Other (Isolates, etc.)

P5a. Photo or Drawing (Photo required for buildings, structures, and objects.)



P5b. Description of Photo:

(View, date, accession #) \_\_\_\_\_

West elevation. \_\_\_\_\_

\*P6. Date Constructed / Age and

Sources: ☒ Historic

☐ Prehistoric ☐ Both

1917

\*P7. Owner and Address:

Naval Station

Treasure Island

San Francisco, CA 94130

\*P8. Recorded by: (Name, affiliation, and address)

Janice Calpo

JRP Historical Consulting

1477 Drew Ave., Suite 105

Davis, CA 95616

\*P9. Date Recorded: 12/12/96

\*P10. Survey Type: (Describe)

Intensive

\*P11. Report Citation: (Cite Survey report and other sources, or enter "none.") Historical Study of Yerba Buena Island,

Treasure Island, and Their Buildings

\*Attachments: ☐ Location Map ☒ Sketch Map ☒ Continuation Sheet

☒ Building, Structure, and Object Record ☐ Linear Resource Record ☐ Archaeological Record ☐ District Record ☐ Milling Station Record ☐ Rock Art Record ☐ Artifact Record ☐ Photograph Record ☐ Other (List) \_\_\_\_\_



**BUILDING, STRUCTURE, AND OBJECT RECORD**

Primary # \_\_\_\_\_  
HRI# \_\_\_\_\_

Page 2 of 4

\*NRPH Status Code \_\_\_\_\_

\*Resource Name or # (Assigned by recorder) Building 61

- B1. Historic Name: Isolation Ward  
B2. Common Name: Building 61. Officers' Quarters  
B3. Original Use: Isolation ward B4. Present Use: Officers' quarters  
\*B5. Architectural Style: Bungalow  
\*B6. Construction History: (Construction date, alterations, and date of alternations.)  
Built 1917. 1917-1929 -- Isolation ward. 1929-1945 -- Quarters. 1945-1952 -- Civilian quarters. 1952-present -- Officers' quarters.

- B7. Moved? ☒ No ☐ Yes ☐ Unknown. Date: \_\_\_\_\_ Original Location: \_\_\_\_\_  
\*B8. Related Features: \_\_\_\_\_

- B9a. Architect: Bureau of Yards and Docks B9b. Builder: Bureau of Yards and Docks  
\*B10. Significance: Theme Naval Station Area Yerba Buena Island. San Francisco  
Period of Significance 1917--1947 Property Type Building Applicable Criteria n/a  
(Discuss importance in terms of historical or architectural context as defined by theme, period, and geographic scope. Also address integrity.)

Building 61 does not appear to be eligible for listing in the National Register because it is not significant. While it retains a fair degree of integrity, the building is not significant architecturally and does not appear to be associated with events or persons important within the context of the Navy operations at Yerba Buena Island.

Buildings 61, along with nearby Buildings 60 and 62 were built on the western slope of Yerba Buena Island in 1917 as isolation wards. While little is known about the history of the buildings, it is presumed they were used to house enlisted personnel with communicable diseases. All hospital-related functions were clustered in this area, and were built in the period, 1917-1919, when the Naval Training Station on Yerba Buena Island experienced a massive build-up as part of the general naval preparedness program. (See continuation sheet.)

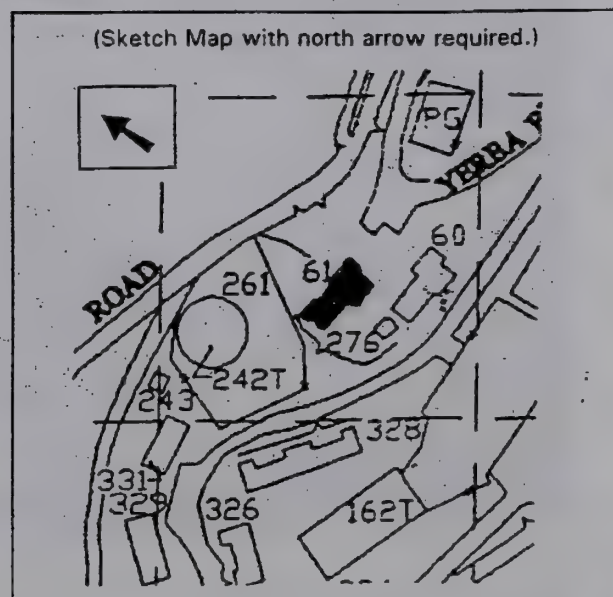
- B11. Additional Resource Attributes: (List attributes and codes): HP34 Military Property

- \*B12. References: Historical Study of Yerba Buena Island, Treasure Island, and Their Buildings, prepared by Mare Island Naval Shipyard Base Realignment and Closure (BRAC)

- B13. Remarks: \_\_\_\_\_

- \*B14. Evaluator: Stephen D. Mikesell  
\*Date of Evaluation: January 1997

(This space reserved for official comments.)



\*Required Information



Page 3 of 4

\*NRPH Status Code \_\_\_\_\_

\*Resource Name or # (Assigned by recorder) Building 61

**DESCRIPTION (continued)**

Building 61 is the least modified of the three buildings. It is sided in its original horizontal board, "drop" siding. The building is side gabled with a front gabled ell at the facade and two ells at the rear. Circle and half-circle vents are found in the gable ends. Eaves are moderate with knee brace brackets placed under them at the gable ends. The front facade facing east has at right an enclosed solarium with multiple pane small fixed lights. The main entry has a small stairway with solid railing leading to the recessed front door with transom and sidelights. The center of the south side features a small gabled portico covering a small stairway and porch. The north side, with an ell at each end, has three -part windows in each ell and at the center. Other windows on the house are predominantly 1/1 double hung aluminum sash, replacements to the original 1/1 double hung wooden sash.

**SIGNIFICANCE (continued)**

The hospital, or dispensary, was situated on Yerba Buena Road, in a site that is now vacant. Buildings 60, 61, and 62 were used for their intended purposes only for a brief time. The Naval Training Station program on the island was reduced dramatically in 1919 and the station was closed in 1923. In 1920, the three buildings were re-used as quarters, initially for civilian employees of the base. An historic photograph of this building, reproduced here as **Photograph 2**, shows the building while still under construction in August, 1917. The re-use of this building for quarters necessitated relatively minor rehabilitation work to the building itself. In the years since 1920, the building has been upgraded on several occasions; these more recent upgrades account for the notable changes to the building, including installation of aluminum windows and installation of a glazed bay at the rear.

Building 61 does not appear to be significant within the context of the history of the island. It was used as an isolation ward for a very short period of time. It has since been used as quarters for civilian employees and later as officers' quarters. It does not appear to be important in any of its three uses (isolation ward, civilian quarters, or officers' quarters). In the first respect, the use was too brief to constitute significance. In terms of civilian quarters, that context is far better represented by Quarters 9, an architecturally significant building that was actually constructed for that purpose. Within the context of officers' quarters, the building is far less important than Quarters 1-8, all of which are architecturally significant and which were built for that purpose. Lacking significance, Building 61 does not meet the criteria for listing in the National Register.

Page 4 of 4

\*NRPH Status Code \_\_\_\_\_

\*Resource Name or # (Assigned by recorder) Building 61



Photo 2. Historic view of Building 61.

\*Required Information



### 3.2. Buildings That Do Not Qualify for Listing in the National Register of Historic Places

#### Yerba Buena Island

Building #	Function	Date
57	Motel	1929
60	Officers' quarters	1917
61	Officers' quarters	1917
62	Officers' quarters	1917
66	Officers' quarters	1917
75	Storage	1918
77	Transformer	1918
105	Officers' quarters	1934
106	Officers' quarters	1934
107	Power house	1917
109	Officers' quarters	1934
111	Officers' quarters	1921
112	Officers' quarters	1921
113	Officers' quarters	1921
114	Officers' quarters	1921
115	Officers' quarters	1921
162	Water tank	1919
168	Water tank	1919
169	Oil tank	1916
170	Oil tank	1916
206	Garage & apartment	1944
207	Garage for Qtr. 9	1936
213	Unknown	1940
221	Prisoners' work shop	1943
225	Pump house	1938
227	Water tank	1938
229	Tower annex	1944
240	Officers' quarters	1944
242	Water tank	1944
243	Pump house	1944
253	Storage for qtr. 62	1945
254	Storage for qtr. 8	1945





## **ATTACHMENT C**

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Archaeological Survey Report





**FIRST SUPPLEMENTAL ARCHAEOLOGICAL SURVEY REPORT  
YERBA BUENA ISLAND RAMPS IMPROVEMENT PROJECT  
YERBA BUENA ISLAND, SAN FRANCISCO COUNTY, CALIFORNIA  
04-SF-80-PM 67.8/8.1**

**EA 04-3A640K**

**Prepared by:**

**AECOM  
2020 L Street, Suite 400  
Sacramento, California 95811  
(916) 414-5800  
January 27, 2010**

*Brian Ludwig*  
**Prepared by:**

Brian Ludwig, Ph.D., Senior Archaeologist

*February 4, 2011*

Date

*Charlane Gross*  
**Reviewed by:**

Charlane Gross, M.A., Senior Archaeologist

*February 4, 2011*

Date

**Prepared for:**

**Eric Cordoba, Project Manager  
SFCTA  
100 Van Ness Avenue, 26th Floor  
San Francisco, CA 94102**

*Janet Pape*  
**Approved by:**

**Janet Pape, Branch Chief, SFOBB Archaeology  
PQS Prehistoric Archaeology, Lead; Historical Archaeology, Co-PI  
Office of Cultural Resources Studies  
Caltrans District 4  
111 Grand Avenue, P.O. Box 23660  
Oakland, California, 94623**

*February 4, 2011*

Date

**February 2011**



# TABLE OF CONTENTS

<b>List of Abbreviated Terms.....</b>	<b>ii</b>
<b>Summary of Findings.....</b>	<b>iii</b>
Proposed Undertaking .....	iii
Purpose and Scope of the Survey .....	iii
<b>Chapter 1    Introduction .....</b>	<b>1</b>
1.1    Archaeological Study Team .....	1
<b>Chapter 2    Project Location and Description .....</b>	<b>2</b>
2.1    Project Location .....	2
2.2    Project Description.....	2
<b>Chapter 3    Sources Consulted .....</b>	<b>4</b>
3.1    Summary of Methods and Results.....	4
3.2    Records Search .....	4
3.3    Summary of Native American Consultation .....	6
<b>Chapter 4    Background.....</b>	<b>7</b>
<b>Chapter 5    Field Methods .....</b>	<b>8</b>
<b>Chapter 6    Study Findings and Conclusions .....</b>	<b>9</b>
6.1    Unidentified Cultural Materials.....	9
<b>Chapter 7    References Cited.....</b>	<b>10</b>

## TABLES

Table 1    Previous Investigations within the APE.....	6
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## APPENDICES

Appendix A    Project Maps
Appendix B    Consultation



## LIST OF ABBREVIATED TERMS

APE	Area of Potential Effects
Authority	San Francisco County Transportation Authority
Caltrans	California Department of Transportation
CFR	Code of Federal Regulations
CRHR	California Register of Historical Resources
NAHC	Native American Heritage Commission
NRHP	National Register of Historic Places
NWIC	Northwest Information Center
PM	Post Mile
Project	Yerba Buena Island Ramps Improvement Project
SAS	Self-Anchored Suspension
SFOBB	San Francisco/Oakland Bay Bridge
TI/YBI	Treasure Island and Yerba Buena Island
YBI	Yerba Buena Island

## SUMMARY OF FINDINGS

This supplemental report documents efforts to comply with state and federal cultural resource regulations for the revised Yerba Buena Island Ramps Improvement Project within Yerba Buena Island (YBI), California (Appendix A, Maps 1 and 2). The additional work was made necessary by changes in the Area of Potential Effects (APE) for the project; the revision consisted of the inclusion of two proposed Building Move Site locations intended for the possible relocation of two significant historic-era buildings. AECOM conducted an archaeological survey of the project APE on January 19, 2011 (Appendix A, Map 3). Prior to the survey, AECOM conducted a records search at the Northwest Information Center of the California Historical Resources Information System and sent consultation request letters to Native Americans identified by the Native American Heritage Commission. One historical archaeological resource (P-38-004322) is located within ¼ mile of the revised APE. The AECOM survey did not identify any additional cultural resources within the revised APE.

## PROPOSED UNDERTAKING

The San Francisco County Transportation Authority (Authority) proposes to implement the Yerba Buena Island Ramps Improvement Project (Project) within Yerba Buena Island, San Francisco County, California (Appendix A, maps 1, 2). The overall Project APE is generally located in the eastern end of YBI where it facilitates the midpoint of the San Francisco/Oakland Bay Bridge. This bridge spans the San Francisco Bay, provides a connection between the City of Oakland and the City of San Francisco, and provides access to facilities on YBI and Treasure Island (Appendix A, Map 2). The Authority is planning to replace the existing westbound on- and off-ramps located on the eastern side of YBI with new ramps that replicate the functional role of the current ramps. The replacement ramps are needed to address seismic, traffic safety, and design standards.

The revised discontinuous APE consists of two separate parcels (each less than 1 acre). These consist of Building Move Site #1 located near the south end of the isthmus that connects Treasure Island and Yerba Buena Island and Building Move Site #2 located on the upper elevation of Yerba Buena Island on Yerba Buena Drive. These two parcels are intended for the relocation of two related historic buildings associated with the U.S. Naval Station Treasure Island that would be adversely affected under an Alternative of the Project. In order to mitigate the adverse effects, it has been proposed that Quarters 10 and associated Building 267 (garage) be moved to one of the two potential sites (Appendix A, Map 2).

The California Department of Transportation (Caltrans), acting as the lead agency under the delegated authority of the Federal Highway Administration, is providing the project oversight as federal funds are involved. Caltrans' oversight is intended to ensure that this undertaking is carried out in a manner consistent with Caltrans' responsibilities under the January 2004 *Programmatic Agreement among the Federal Highway Administration, the Advisory Council on Historic Preservation, the California State Historic Preservation Officer, and the California Department of Transportation Regarding Compliance with Section 106 of the National Historic Preservation Act, as it Pertains to the Administration of the Federal-Aid Highway Program in California*.

## PURPOSE AND SCOPE OF THE SURVEY

The proposed Project would be subject to the cultural resources requirements of the California Environmental Quality Act (CEQA). In addition, because of the use of Metropolitan Transportation Commission funding (federal funds administered by Caltrans), provisions of Section 106 of the National Historic Preservation Act are applicable to the cultural resources study. In accordance with both CEQA and Section 106 standards, AECOM cultural resources specialists conducted archival research and Native American consultation as well as field investigations. AECOM architectural historians and an archaeologist conducted an intensive field survey of the revised APE on January 19, 2011. All work was completed following the guidance in the Environmental Handbook, Volume 2, Cultural Resources of the Standard Environmental Reference (2008). Additional survey will be required if the project changes to include areas not previously surveyed.

It is Caltrans' policy to avoid cultural resources whenever possible. Further investigations may be needed if the site(s) cannot be avoided by the project. If buried cultural materials are encountered during construction, it is Caltrans' policy that work stop in that area until a qualified archaeologist can evaluate the nature and significance of the find.

*This document contains information on the nature and location of cultural resources. In accordance with Section 9 of the Archaeological Resources Protection Act of 1979 (16 USC §470hh) and Section 304 of the National Historic Preservation Act of 1966 (16 USC §470w-3), this information is privileged and is intended for limited distribution only.*



# CHAPTER 1 INTRODUCTION

One of the San Francisco County Transportation Authority (Authority) proposed alternatives is Alternative 2b of the Yerba Buena Island Ramps Improvement Project (Project) within Yerba Buena Island (YBI), San Francisco County, California (Appendix A, Maps 1 and 2). The overall Project Area of Potential Effects (APE) is generally located in the eastern end of YBI where it facilitates the midpoint of the San Francisco/Oakland Bay Bridge (SFOBB). This bridge spans the San Francisco Bay, provides a connection between the City of Oakland and the City of San Francisco, and provides access to facilities on YBI and Treasure Island. The proposed ramps will be elevated structures with precise pier locations to be determined at a later date. AECOM archaeologists conducted an intensive archaeological inventory of the initial APE on January 12, 2009. Subsequent revisions to the APE consisted of the addition of two proposed building move sites to accommodate the relocation of two historic-era buildings (Quarters 10 and Building 167) associated with the U.S. Naval Station Treasure Island. AECOM cultural resources specialists conducted archival research, Native American consultation, and an intensive field survey for the revised APE. The field survey intended to document the presence of previously-unrecorded cultural resources was conducted on January 19, 2011.

## 1.1 ARCHAEOLOGICAL STUDY TEAM

AECOM conducted this study according to current professional and legal standards for archaeological investigations. The study team consisted of professionally trained archaeologists and historians meeting the Secretary of the Interior's Professional Qualification Standards 36 Code of Federal Regulations (CFR) Part 61; 48 FR 44716 and technical support staff. The following individuals were key participants in this effort:

Person	Position	Qualifications
Brian Ludwig, Ph.D.	Senior Archaeologist	27 yrs. professional and academic experience, 9 yrs. California/Nevada specialist in survey, data recovery, lithic analysis, human interments, Native American consultation.
Charlane Gross, M.A.	Senior Review	24 yrs. professional and academic experience, 13 years California, regulatory compliance, Native American consultation, federal and state agency coordination.
Mark Bowen, M.A	Senior Historian/Architectural Historian	14 yrs. professional experience in California history and architectural history. Specialist in architectural history, primary/secondary document research and context preparation.

## CHAPTER 2 PROJECT LOCATION AND DESCRIPTION

### 2.1 PROJECT LOCATION

The San Francisco County Transportation Authority proposes to implement the Yerba Buena Island Ramps Improvement Project in Yerba Buena Island, San Francisco County, California (Appendix A, Map 1), in Caltrans District 4. The overall project APE is generally located in the eastern end of YBI where it facilitates the midpoint of the SFOBB. This bridge spans the San Francisco Bay, provides a connection between the City of Oakland and the City of San Francisco, and provides access to facilities on YBI and Treasure Island. The proposed project is located between Post Mile (PM) 7.8 and 8.1 starting at the east portal of the YBI tunnel and ending before the SFOBB Transition Structure, and is depicted on the U.S. Geological Survey Oakland West, CA topographic quadrangle map. The revised discontinuous APE consists of two separate proposed building move sites (Building Move Site #1 and Building Move Site #2). Building Move Site #1 is located near the south end of the isthmus that connects Treasure Island and Yerba Buena Island. Building Site #2 is located at a higher point of Yerba Buena Island's elevation along Yerba Buena Drive (Appendix A, Maps 1 and 2).

### 2.2 PROJECT DESCRIPTION

This YBI Ramps Improvement Project is separate and independent of the SFOBB East Span Seismic Safety Project, which is currently under construction and the Treasure Island and Yerba Buena Island (TI/YBI) Redevelopment Plan, which is currently undergoing its own environmental review process.

Yerba Buena Island is located in the San Francisco Bay approximately halfway between Oakland and San Francisco. YBI is only accessible to vehicular traffic via the SFOBB stretch of I-80. The SFOBB is considered critical link between the East Bay and San Francisco. It provides the only vehicle access to YBI, the active U.S. Coast Guard facilities located on the south side of the island, and Treasure Island, located immediately north of YBI.

The proposed project would replace the existing westbound on- and off-ramps located on the east side of YBI with new westbound on- and off-ramps. The new ramps would maintain the functional role of the current ramps while satisfying seismic requirements, highway design standards, traffic operations, and improve safety. The YBI Ramps Improvement Project is independent of both the SFOBB East Span Seismic Safety Project, currently under construction, and the Treasure Island and Yerba Buena Island (TI/YBI) Redevelopment Plan, currently undergoing its own environmental review process.

The purpose of the project is to improve the safety of the westbound on- and off-ramps to the extent physically and economically feasible. The current ramps do not meet current Caltrans design standards. The proposed project would provide standard deceleration length for the off-ramp and improved acceleration/merging length for the on-ramp. In addition, the project would improve traffic operations to and from YBI.

Alternatives have been proposed to address the geometric deficiencies of the existing on- and off-ramps. In addition to the no-build alternative, the proposed build alternatives would analyze the effects to the SFOBB (I-80) mainline structure and YBI. The proposed project is located between post-mile (PM) 7.6 and 8.1<sup>1</sup> beginning at the east portal of the YBI tunnel and ending at the east side of the Transition Structure portion of the new SFOBB.

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<sup>1</sup> Kilometer Post (KP) 12.3 and 13.2.

The SFOBB Transition Structure is located between PM 7.9 and 8.1 between the YBI tunnel and the SFOBB Self-Anchored Suspension (SAS) span.<sup>2</sup>

The previous reports including: Historic Property Survey Report Yerba Buena Island Ramps Improvement Project Yerba Buena Island, San Francisco County, California 04-SF-80-PM 7.6/8.1 (2009); Archaeological Survey Report Yerba Buena Island Ramps Improvement Project Yerba Buena Island, San Francisco County, California 04-SF-80-PM 7.6/8.1 (2009); and Finding of Effect Yerba Buena Island Ramps Improvement Project Yerba Buena Island, San Francisco County, California 04-SF-80-PM 7.6/8.1 (2009), identified historic properties within the original APEs and assessed the potential effects of each alternative on the historic properties. This supplemental ASR addresses the potential for historic properties within the supplemental APEs only.

Three alternatives are currently under consideration for the proposed project. However, only one alternative would require the relocation of Quarters 10 and Building 267 to one of the two proposed supplemental parcels:

### **2.2.1 ALTERNATIVE 2B**

Alternative 2b would include removal of the existing westbound on- and off-ramps on the east side of YBI, construction of a westbound loop on-ramp from Macalla Road on the east side of YBI, and construction of a westbound off-ramp to Macalla Road on the east side of YBI (see Appendix A, Map 2).

Two building move sites (Building Move Site #1 and Building Move Site #2) have been proposed as potential locations for Quarters 10 and Building 267. One of these sites would be chosen under this alternative. Additional information regarding the No Build Alternative and Alternative 4 is described in the previous Archaeological Survey Report (ASR) document (Caltrans 2009).

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<sup>2</sup> The SFOBB Transition Structure is the name of a section of the new Bay Bridge. The Transition Structure will connect the Self-Anchored Suspension (SAS) span to Yerba Buena Island, and will transition the East Span's side-by-side road decks to the upper and lower decks of the YBI tunnel and West Span.



## CHAPTER 3 SOURCES CONSULTED

### 3.1 SUMMARY OF METHODS AND RESULTS

This supplemental study included pre-field research consisting of a records search conducted at the Northwest Information Center (NWIC) of the California Historical Resources Information System, Native American consultation, an intensive field survey of the project APE, and documentation of the investigation.

### 3.2 RECORDS SEARCH

The research into cultural resources issues for the project began with a records search of pertinent cultural resource information for the overall APE (which included the revised APE) conducted by Lisa Hagel of the NWIC on 24 November, 2008. Given that the initial records search request was conducted in November 2008, an updated records search was requested for the purposes of this supplemental study. The supplemental request was made on January 18, 2011.

The 2008 search was conducted at the NWIC which is located at Sonoma State University, Department of Anthropology, in Rohnert Park, California. The records search included review of properties listed in the National Register of Historic Places (NRHP) (National Park Service 1996) and the California Register of Historical Resources (CRHR) (State of California 1976), numerous other state and county historic resource listings, and historic plat maps and USGS maps. The records search included, but was not necessarily restricted to, a review of select publications, maps, and properties listed in the following sources:

- ▶ *National Register of Historic Places* (National Park Service 1996 and updates),
- ▶ *California Register of Historical Resources* (State of California 1976 and updates),
- ▶ *California Points of Historical Interest* (State of California 1992 and updates),
- ▶ *California Historical Landmarks* (State of California 1990),
- ▶ *Directory of Properties in the Historical Resources Inventory* (State of California 2008),
- ▶ *California Inventory of Historic Resources* (State of California March 1976).

One historical archaeological resource, P-38-004322, which consists of sections of a retaining wall and weir with inscriptions by prisoners-of-war who built it in the 1940s, is located in the general vicinity of the revised APE. This resource was discovered and recorded in 2003 (Erghman and Lee 2003) during hillside vegetation removal near Clipper Cove east of the YBI Ramps project for the SFOBB New East Span Seismic Safety Project. This resource was evaluated to be ineligible for inclusion on the National Register (Supernowicz 2003).

The NWIC record search demonstrated that a total of 23 cultural resources investigations have been conducted within and in the vicinity (approximately 1 mile radius) of the revised Project APE. Before the efforts outlined in this current Supplemental Archaeological Survey Report, there were at least eight studies that have occurred directly within the overall Yerba Buena Island Ramps Improvement Project APE (Table 1); the earliest documented investigations conducted within the vicinity of the overall Project area APE consist of Rudo (1982) and Roop (1984). With the exception of Rudo's thesis, each of these prior studies was related to Caltans' seismic retrofit of the Bay Bridge and the Navy's privatization efforts regarding Yerba Buena Island.

Of the eight above-mentioned studies, two - PAR (1997) and the Southwest Division, Naval Facilities Engineering (2003), included the two proposed Building Move sites. The PAR study identified a total of 21 isolated historic-era features related to naval base construction and operations. The 2003 Southwest Division, Naval Facilities Engineering report consisted of a research design. No prehistoric or historic-era sites, features, artifacts, buildings, or structures were identified within or in the immediate vicinity of the Building Move sites by either the PAR investigation or the Southwest Division, Naval Facilities Engineering report.

**Table 1**  
**Previous Investigations within the Revised APE and Vicinity**

NWIC Study Nr.	Author	Date	Title
6160	Mark Ogden Rudo - San Francisco State University	1982	The Prehistory of San Francisco (Thesis)
18218	Glenn J.Gmoser – Caltrans	1995	Archaeological Survey Report, San Francisco – Oakland Bay Bridge Seismic Retrofit
19317	Blossom Hamusek-McGann, Mary Maniery, and Cindy Baker – PAR Environmental Services	1997	Archaeological Inventory and Assessment of Naval Station Treasure Island Disposal and Reuse Project, San Francisco County, California
24600	John Nelson, Stephen Mikesell, Dan Peterson, and Mark Ketchum	1999	HAER, San Francisco Oakland Bay Bridge, HAER NO. CA-32 (Volumes 1-3)
25242	Sally Salzman Morgan and Sean Dexter – URS Corporation	2002	Research Design and Treatment Plan for Archaeological Site CA-SFR-04/H, Yerba Buena Island, San Francisco, California.
33644	Southwest Division, Naval Facilities Engineering	2003	Draft Archaeological Research Design and Discovery Plan for the Disposal of Former Naval Station Treasure Island, San Francisco, California.
33893	Caltrans	2006	Historic Structure Report, Torpedo Building (Navy Building 262), Yerba Buena Island, San Francisco, California.
36020	Sally Morgan, Sean Dexter, Pat Mikkelsen, Brian F. Byrd, Jeff Rosenthal, and Sharon Waechter – URS, Caltrans, and Far Western Anthropological Research Group, Inc.	2008	San Francisco-Oakland Bay Bridge East Span Seismic Safety Project, Archaeological Analysis of CA-SFR-4/H, Yerba Buena Island, San Francisco & Alameda Counties, California.
Source: NWIC, compiled by AECOM 2009; Updated 2011			

Several of the investigations documented by the NWIC within the revised APE vicinity included architectural surveys. These were: Goldenberg (1995), Windmiller (2002), Bay Area Rapid Transit (2005), Stone and Foster (2005), and Caltrans (2006). Additional studies conducted within the vicinity of the Yerba Buena Island Ramps Improvement Project APE (1-mile) included a thesis for San Francisco State University regarding the prehistory of San Francisco (Rudo 1982). Lastly, one study consisted at least in part of a cultural resources records/literature search in response to the need for four candidate sites for Navy family housing in Alameda, Contra Costa, San Francisco, and Marin Counties. At least one archaeological study conducted within the APE and was not included with the NWIC materials. This additional report was the June 1998 Final ASR for the San Francisco-Oakland Bay Bridge Seismic Safety Project. This 1998 ASR also included an Extended Phase I for CA-SFR-04/H, an evaluation of historic archaeological resources on Yerba Buena Island, and a request for determination of eligibility for the prehistoric component of CA-SFR-04/H (Caltrans 1998).

Previous studies that have been conducted outside the overall and revised APE demonstrate the general sensitivity of the area for exhibiting prehistoric and historic-era cultural sites, features, and artifacts. A single prehistoric archaeological site, CA-SFR-04/H, a shell mound containing habitation debris and human interments, has been identified in the general vicinity of the revised APE. The prehistoric component of this site has been determined eligible to the NRHP by the SHPO. Other cultural resources identified in the vicinity of the revised APE consist of built-environment resources such as military and Caltrans buildings identified through intensive surveys and literature searches.



The January 2011 records search update confirmed that no prehistoric or historic-era cultural sites, features, or artifacts have been documented directly within the revised APE. For a comprehensive list of References, please refer to the initial ASR produced for this project (Caltrans 2009).

### **3.3 SUMMARY OF NATIVE AMERICAN CONSULTATION**

Implementing regulations for Section 106 require that Federal agencies identify any Indian tribes that might attach religious and cultural significance to historic properties in the APE and invite them to be consulting parties (36 CFR 800.3[f][2]). AECOM consulted with the Native American Heritage Commission (NAHC) on November 7, 2008 to request a search of the NAHC's Sacred Lands Files to request a list of Native American tribes or individuals that might have concerns about properties in and near the overall APE. Responses from the NAHC did not indicate the presence of Native American cultural resources or areas of cultural sensitivity in the immediate vicinity of the project APE.

AECOM contacted each of the representatives on a list provided by the NAHC by letter and subsequent phone calls. The 2008 consultation program is considered complete and related documentation is presented in Appendix C of the initial ASR. In order to update this consultation specifically for the supplemental APE, AECOM submitted a new information request to the NAHC on January 20, 2011. However, in order to expedite the consultation process, AECOM sent new contact letters to all of those individuals and/or groups suggested by the NAHC for the overall YBI Project APE investigation effort in 2008. On February 2, 2011, AECOM cultural staff placed follow-up phone calls with each of the contacts listed in the 2008 NAHC response. The NAHC supplied a new list on February 3, 2011, which included two additional contacts to those identified in the 2008 NAHC response. On February 3, 2011, AECOM cultural staff submitted email notifications to each of these contacts as well as hardcopy letters.



## **CHAPTER 4 BACKGROUND**

For the Background Section of this ASR, please refer to the initial ASR produced for this project (Caltrans 2009).

## CHAPTER 5 FIELD METHODS

All aspects of the cultural resource study were conducted in accordance with the *Secretary of the Interior's Standards and Guidelines for Identification of Cultural Resources* (48 CFR 44720-23). Resource documentation followed the guidance outlined in *Instructions for Recording Historical Resources* (California Office of Historic Preservation 1995) and the Environmental Handbook, Volume 2, Cultural Resources of the Standard Environmental Reference (2011)

Because of the developed nature of Building Move Site #2 and the steep grades and dense vegetation on Building Move Site #1, an archaeological survey utilizing regularly-spaced pedestrian transects could not be conducted. However, on 19 January, 2011 AECOM archaeologist Brian Ludwig, Ph.D. intensively examined both portions of the supplemental APE (Appendix A, Map 3). Because of the developed/filled character of both building move sites, the vast majority of the APE did not include undisturbed exposed ground surface. No archaeological materials or soils indicative of prehistoric or historic-era occupation/ activity were noted.

## **CHAPTER 6 STUDY FINDINGS AND CONCLUSIONS**

### **6.1 UNIDENTIFIED CULTURAL MATERIALS**

Previous cultural analysis within the revised APE and vicinity as well as current archival and field research indicates extensive historic-era grading, land filling, and previously disturbed site conditions from construction activities. In addition, steep slopes noted within both proposed Building Move sites are not likely to contain significant traces of prehistoric or undocumented historic-era activities. Several of these areas around the APE were therefore not included. Although there is always a possibility that traces of previously undocumented prehistoric and historic-era materials could be encountered within the revised APE as a result of project-related ground-disturbing activities, given the level of previous disturbances and the nature of the topography, such an occurrence is considered highly unlikely.

If previously unidentified cultural materials are unearthed during construction, it is Caltrans' policy that work be halted in that area until a qualified archaeologist can assess the significance of the find. Additional archaeological survey may be needed if project limits are extended beyond the present survey limits.



## CHAPTER 7 REFERENCES CITED

### California, State of

- 2000 Directory of Properties in the Historical Resources Inventory. On file, Northwest Information Center of the California Historical Resources Information System, Sonoma State University. Rohnert Park, CA.
- 1999 Office of Historic Preservation. Technical Assistance Series #10. California State Law and Historic Preservation: Statues, Regulations, and Administrative Policies regarding Historic Preservation of Cultural and Historical Resources, Sacramento, CA.
- 1995 Instructions for Recording Historical Resources. Department of Parks and Recreation, Office of Historic Preservation. Sacramento, CA.
- 1992 California Points of Historical Interest. Department of Parks and Recreation, Office of Historic Preservation. On file, Northwest Information Center of the California Historical Resources Information System, Sonoma State University. Rohnert Park, CA.
- 1990 California Historical Landmarks. Department of Parks and Recreation, Office of Historic Preservation, Sacramento, CA.
- 1976 California Register of Historic Resources, Data base on file at the Northwest Information Center, California State University, Sonoma, Rohnert Park, CA.

### California Department of Transportation (Caltrans)

- 2009 Archaeological Survey Report Yerba Buena Island Ramps Improvement Project , Yerba Buena Island, San Francisco County, California 04-SF-80-PM 67.8/8.1. On file, Caltrans District 04, Oakland, California.
- 1995 Archeological Survey Report. San Francisco-Oakland Bay Bridge Seismic Retrofit 04-SF-80-P.M. 4.80/8.85, 04-ALA-80-P.M. 0.0/1.15. G. Gmoser, author. On file, Caltrans District 04, Oakland, California.
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### Egherman, R. and C. Lee

- 2003 YI POW Wall (P-38-004322 [CA-SFr-149H]). California Department of Parks and Recreation Primary Record. On file at the Northwest Information Center, Sonoma State University, Rohnert Park, CA

### Heizer, R.F.

- 1949 *The Archaeology of Central California I: The Early Horizon*. University of California Anthropological Records 12 (1).

### JRP

- 1997 Historic Context for Evaluation Building and Structures at Treasure Island and Yerba Buena Island, Naval Station, Treasure Island, California. On file, Environmental Department, Naval Station, Treasure Island, San Francisco, California.

### Langley, H. G and S.A. Morison

- 1859 *The State Register and Year Book of Facts for the Year 1859*. Henry G. Langley and Samuel A. Morison, ed. San Francisco, CA.

PAR Environmental Services, Inc.

- 1997 Archaeological Inventory and Assessment of Naval Station Treasure Island Disposal and Reuse Project, San Francisco County, California. Authored by: Hamusek-McGann, B., M. Maniery, and C. Baker., PAR Environmental Services, Inc., Sacramento, CA.

Salzman-Morgan, S. and S. Dexter

- 2002 Research Design and Treatment Plan for Archaeological Site CA-SFr-04/H, Yerba Buena Island, San Francisco, California.

Southwest Division, Naval Facilities Engineering

- 2003 Draft Archaeological Research Design and Discovery Plan for the Disposal of Former Naval Station Treasure Island, San Francisco, California.

Supernowicz, Dana

- 2003 Historic Resources Evaluation Report (HRER) for a Concrete Wall and Form being part of the San Francisco Bay Bridge East Span Project, U.S. Coast Guard Utility Relocation EA 04-0120Q3/ PM 12.6/13.9. Report prepared by Caltrans, Sacramento, CA for Caltrans District 4, San Francisco, CA.

United States Senate

- 1871 41st Congress, 3rd session, Miscellaneous document No. 48. Memorial of Thomas H. Dowling and accompanying papers in regard to his claim to the Island of Yerba Buena in the Harbor of San Francisco, California. Govt. Printing Office. Washington, D.C.

Walker, D.

- 1870 Yerba Buena Island, California: Report of Acting Assistant Surgeon David Walker, United States Army. Contained in: Circular No. 4., War Department Surgeon General's Office, Washington December 5, 1970, A Report on Barracks and Hospitals with Descriptions of Military Posts. Washington Government Printing Office 1870.





## **APPENDIX A**

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Project Maps



Map 1:  
Project Vicinity and Location

Yerba Buena Island  
Ramps Improvement Project



Portion of USGS topographic quadrangles  
Oakland West and San Francisco North

Project Location Supplemental Project Area Transition Structure Portion of SFOBB

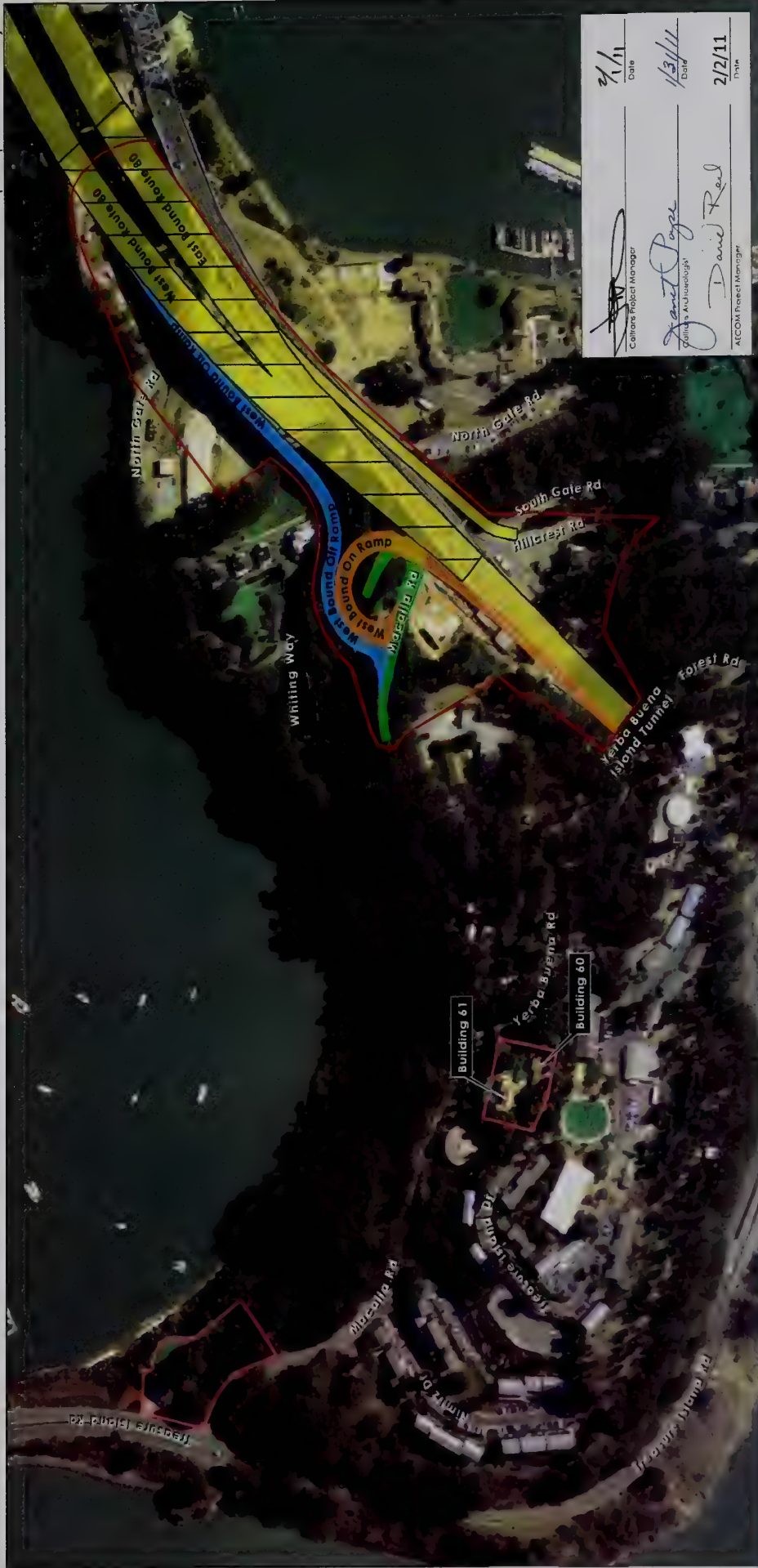
0 0.25 0.5 Miles





Map 2: Supplemental Archeological APE (Alternative 2b)

Yerba Buena Island  
Ramps Improvement Project







Map 3: Supplemental Archeological Survey Coverage (Alternative 2b)

Yerba Buena Island  
Ramps Improvement Project



**Alternative 2b Proposed Ramps**

- Proposed West Bound On Ramp
- Proposed East Bound On Ramp
- Proposed Macallia Road Improvements

**Area of Potential Effect Signed October 24, 2008**

- Area of Potential Effect of Potential Effect
- Supplemental Area of Potential Effect
- Supplemental Survey Coverage

**Separate Project Currently Under Construction**

- San Francisco-Oakland Bay Bridge
- East Span Seismic Safety Project
- Transition Structure Portion of SFOBB

Imagery: Nasa/USGS 2004  
Data: DMJM/Hem, AECOM  
1/11

0 100 200 Feet



## **APPENDIX B**

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Consultation







AECOM  
2020 L Street, Suite 400  
Sacramento, CA 95811  
[www.aecom.com](http://www.aecom.com)

916.414.5800 tel  
916.414.5850 fax

January 18, 2011

Debbie Pilas-Treadway  
California Native American Heritage Commission  
915 Capitol Mall, Room 364  
Sacramento, CA 9514

**Subject: Yerba Buena Island Interchange Project – Supplemental Information**

Dear Ms. Pilas-Treadway:

AECOM is conducting supplemental cultural resources studies for the above referenced project located on Yerba Buena Island, San Francisco County, and is shown on the enclosed portion of *Oakland West* USGS topographic quadrangle map. The proposed project consists of constructing interchange ramps to be located at the east side of Yerba Buena Island and will connect with the separate East Bay Bridge Project.

We previously brought this project to the NAHC's attention in November 2008, and as part of the supplemental studies we would appreciate any information you can provide regarding prehistoric, historic, or ethnographic Native American values that may be present near or within our project area. We would like to request a search of the NAHC Sacred Lands files.

Please send via email or facsimile a listing of local Native American groups or representatives at your earliest convenience, so that we may contact appropriate individuals and account for their potential concerns in the planning process.

If you have any questions or comments please contact Mark Bowen at 916.414.5800 or [mark.bowen@aecom.com](mailto:mark.bowen@aecom.com). Thank you in advance for your assistance.

Sincerely,

Patricia E. Ambacher  
Architectural Historian

Enclosure

## Sacred Lands File & Native American Contacts List Request

### NATIVE AMERICAN HERITAGE COMMISSION

915 Capitol Mall, RM 364

Sacramento, CA 95814

(916) 653-4082

(916) 657-5390 – Fax

[nahe@pacbell.net](mailto:nahe@pacbell.net)

*Information Below is Required for a Sacred Lands File Search*

Project: Yerba Buena Island Interchange Project – Supplemental Information

County San Francisco

USGS Quadrangle Oakland West

Name \_\_\_\_\_

Township \_\_\_\_\_ Range \_\_\_\_\_ Section(s) \_\_\_\_\_

Company/Firm/Agency:

AECOM

Contact Person: Mark Bowen

Street Address: 2020 L Street, Suite 400

City: Sacramento Zip: 95811

Phone: 916-414-5800

Fax: 916-414-5850

Email: mark.bowen@aecom.com

#### Project Description:

The above referenced project is located on Yerba Buena Island, San Francisco County, and is shown on the enclosed portion of *Oakland West* USGS topographic quadrangle map. The proposed project consists of constructing interchange ramps to be located at the east side of Yerba Buena Island and will connect with the separate East Bay Bridge Project.







AECOM  
2020 L Street, Suite 400  
Sacramento, CA 95811  
www.aecom.com

916.414.5800 tel  
916.414.5850 fax

January 20, 2011

Ann Marie Sayers  
Chairperson  
Indian Canyon Mutsun Band of Costanoan  
P.O. Box 28  
Hollister, CA 95024

**Subject: Yerba Buena Island Interchange Project – Supplemental Information**

Dear Ms. Sayers:

AECOM is conducting cultural resources studies for the above-referenced project located on Yerba Buena Island, San Francisco County and is shown on the attached portion of the USGS topographic quadrangle map.

We are pleased to bring this activity to your attention, and would appreciate any information you can provide regarding prehistoric, historic, or ethnographic Native American land use. We are also interested in any contemporary Native American values that may be present near or within the project area.

If you have any questions or comments feel free to contact Mark Bowen by email at Mark.Bowen@aecom.com, or by phone at 916.414.5800. You may also contact Senior Archaeologist Brian Ludwig at Brian.Ludwig@aecom.com or by phone at 916.414.5886. We look forward to hearing from you soon and hope we will have the opportunity to work together on this project.

Sincerely,

Patricia E. Ambacher  
Architectural Historian

Enclosure



AECOM  
2020 L Street, Suite 400  
Sacramento, CA 95811  
www.aecom.com

916.414.5800 tel  
916.414.5850 fax

January 20, 2011

Jakki Kehl  
1307 Horizon Lane  
Patterson, CA 95363

**Subject: Yerba Buena Island Interchange Project – Supplemental Information**

Dear Ms. Kehl:

AECOM is conducting cultural resources studies for the above-referenced project located on Yerba Buena Island, San Francisco County and is shown on the attached portion of the USGS topographic quadrangle map.

We are pleased to bring this activity to your attention, and would appreciate any information you can provide regarding prehistoric, historic, or ethnographic Native American land use. We are also interested in any contemporary Native American values that may be present near or within the project area.

If you have any questions or comments feel free to contact Mark Bowen by email at Mark.Bowen@aecom.com, or by phone at 916.414.5800. You may also contact Senior Archaeologist Brian Ludwig at Brian.Ludwig@aecom.com or by phone at 916.414.5886. We look forward to hearing from you soon and hope we will have the opportunity to work together on this project.

Sincerely,

Patricia E. Ambacher  
Architectural Historian

Enclosure





AECOM  
2020 L Street, Suite 400  
Sacramento, CA 95811  
www.aecom.com

916.414.5800 tel  
916.414.5850 fax

January 20, 2011

Ramona Garibay  
Representative  
Trina Marine Ruano Family  
16010 Halmar Lane  
Lathrop, CA 95330

**Subject: Yerba Buena Island Interchange Project – Supplemental Information**

Dear Ms. Gariby:

AECOM is conducting cultural resources studies for the above-referenced project located on Yerba Buena Island, San Francisco County and is shown on the attached portion of the USGS topographic quadrangle map.

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Sincerely,

Patricia E. Ambacher  
Architectural Historian

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www.aecom.com

916.414.5800 tel  
916.414.5850 fax

January 20, 2011

Andrew Galvan  
The Ohlone Indian Tribe  
PO Box 3152  
Fremont, CA 94539

**Subject: Yerba Buena Island Interchange Project – Supplemental Information**

Dear Mr. Galvan:

AECOM is conducting cultural resources studies for the above-referenced project located on Yerba Buena Island, San Francisco County and is shown on the attached portion of the USGS topographic quadrangle map.

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Architectural Historian

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www.aecom.com

916.414.5800 tel  
916.414.5850 fax

January 20, 2011

Rosemary Cambria  
Chairperson  
Muwekma Ohlone Indian Tribe of the  
San Francisco Bay Area  
PO Box 360791  
Milpitas, CA 95036

**Subject: Yerba Buena Island Interchange Project – Supplemental Information**

Dear Ms. Cambria:

AECOM is conducting cultural resources studies for the above-referenced project located on Yerba Buena Island, San Francisco County and is shown on the attached portion of the USGS topographic quadrangle map.

We are pleased to bring this activity to your attention, and would appreciate any information you can provide regarding prehistoric, historic, or ethnographic Native American land use. We are also interested in any contemporary Native American values that may be present near or within the project area.

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Patricia E. Ambacher  
Architectural Historian

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AECOM  
2020 L Street, Suite 400  
Sacramento, CA 95811  
www.aecom.com

916.414.5800 tel  
916.414.5850 fax

January 20, 2011

Irene Zwierlein  
Chairperson  
Amah/Mutsun Tribal Band  
789 Canada Road  
Woodside, CA 94062

**Subject: Yerba Buena Island Interchange Project – Supplemental Information**

Dear Ms. Zwierlein:

AECOM is conducting cultural resources studies for the above-referenced project located on Yerba Buena Island, San Francisco County and is shown on the attached portion of the USGS topographic quadrangle map.

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Patricia E. Ambacher  
Architectural Historian

Enclosure



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2020 L Street, Suite 400  
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www.aecom.com

916.414.5800 tel  
916.414.5850 fax

January 18, 2011

Eric Cordoba  
Project Manager  
San Francisco County Transportation Authority  
SFCTA  
100 Van Ness Avenue, 26th Floor  
San Francisco, CA 94102

**Subject: Yerba Buena Westbound On- and Off-Ramps, San Francisco-Oakland Bay Bridge**

Dear Mr. Cordoba:

AECOM is conducting supplemental cultural resources studies for the above referenced project located on Yerba Buena Island, San Francisco County. Additional acreage of Yerba Buena Island has been added to the proposed project area. Please see the attached map for the general areas that have been added to the proposed project. These two sites have been added to the study area as they are needed to mitigate project effects including relocation of historic properties Quarters 10 and Building 267.

If you or your organization has any concerns regarding specific historical resources within these added project locations please contact me at my office. I can be reached by email at [patricia.ambacher@aecom.com](mailto:patricia.ambacher@aecom.com) or telephone at 916.414.5805.

Sincerely,

Patricia E. Ambacher  
Architectural Historian

Enclosure



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2020 L Street, Suite 400  
Sacramento, CA 95811  
[www.aecom.com](http://www.aecom.com)

916.414.5800 tel  
916.414.5850 fax

January 18, 2011

Angela Robinson  
Alameda County Parks, Recreation and Historical Commission  
224 West Winton Avenue, #151  
Hayward, CA 94544

**Subject: Yerba Buena Westbound On- and Off-Ramps, San Francisco-Oakland Bay Bridge**

Dear Ms. Robinson:

AECOM is conducting supplemental cultural resources studies for the above referenced project located on Yerba Buena Island, San Francisco County. Additional acreage of Yerba Buena Island has been added to the proposed project area. Please see the attached map for the general areas that have been added to the proposed project. These two sites have been added to the study area as they are needed to mitigate project effects including relocation of historic properties Quarters 10 and Building 267.

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Sincerely,

Patricia E. Ambacher  
Architectural Historian

Enclosure



January 18, 2011

The Honorable Wilton "Mac" McKibben  
President  
Alameda Historical Society  
PMB 307  
484 Lake Park Avenue  
Oakland, CA 94610-2730

**Subject: Yerba Buena Westbound On- and Off-Ramps, San Francisco-Oakland Bay Bridge**

Dear Judge McKibben:

AECOM is conducting supplemental cultural resources studies for the above referenced project located on Yerba Buena Island, San Francisco County. Additional acreage of Yerba Buena Island has been added to the proposed project area. Please see the attached map for the general areas that have been added to the proposed project. These two sites have been added to the study area as they are needed to mitigate project effects including relocation of historic properties Quarters 10 and Building 267.

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Sincerely,



Patricia E. Ambacher  
Architectural Historian

Enclosure

January 18, 2011

Betty Marvin  
Planner  
Oakland Cultural Heritage Survey  
250 Frank H. Ogawa Plaza, Suite 3330  
Oakland, CA 94612

**Subject: Yerba Buena Westbound On- and Off-Ramps, San Francisco-Oakland Bay Bridge**

Dear Ms. Marvin:

AECOM is conducting supplemental cultural resources studies for the above referenced project located on Yerba Buena Island, San Francisco County. Additional acreage of Yerba Buena Island has been added to the proposed project area. Please see the attached map for the general areas that have been added to the proposed project. These two sites have been added to the study area as they are needed to mitigate project effects including relocation of historic properties Quarters 10 and Building 267.

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Sincerely,



Patricia E. Ambacher  
Architectural Historian

Enclosure

January 18, 2011

Joan Pavlinec  
Secretary & Historic Preservation Planner  
Oakland Landmarks Preservation Advisory Board  
250 Frank H. Ogawa Plaza, Suite 3315  
Oakland, CA 94612

**Subject: Yerba Buena Westbound On- and Off-Ramps, San Francisco-Oakland Bay Bridge**

Dear Ms. Pavlinec:

AECOM is conducting supplemental cultural resources studies for the above referenced project located on Yerba Buena Island, San Francisco County. Additional acreage of Yerba Buena Island has been added to the proposed project area. Please see the attached map for the general areas that have been added to the proposed project. These two sites have been added to the study area as they are needed to mitigate project effects including relocation of historic properties Quarters 10 and Building 267.

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Patricia E. Ambacher  
Architectural Historian

Enclosure





AECOM  
2020 L Street, Suite 400  
Sacramento, CA 95811  
www.aecom.com

916.414.5800 tel  
916.414.5850 fax

January 18, 2011

Dea Bacchetti  
President  
Oakland Heritage Alliance  
446 17<sup>th</sup> Street, Suite 301  
Oakland, CA 94612

**Subject: Yerba Buena Westbound On- and Off-Ramps, San Francisco-Oakland Bay Bridge**

Dear Ms. Bacchetti:

AECOM is conducting supplemental cultural resources studies for the above referenced project located on Yerba Buena Island, San Francisco County. Additional acreage of Yerba Buena Island has been added to the proposed project area. Please see the attached map for the general areas that have been added to the proposed project. These two sites have been added to the study area as they are needed to mitigate project effects including relocation of historic properties Quarters 10 and Building 267.

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Sincerely,

Patricia E. Ambacher  
Architectural Historian

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AECOM  
2020 L Street, Suite 400  
Sacramento, CA 95811  
www.aecom.com

916.414.5800 tel  
916.414.5850 fax

January 18, 2011

Christine S. Lehnertz  
Regional Director  
National Park Service, Pacific West Region Office  
One Jackson Center  
1111 Jackson Street, Suite 700  
Oakland, CA 94607

**Subject: Yerba Buena Westbound On- and Off-Ramps, San Francisco-Oakland Bay Bridge**

Dear Ms. Lehnertz:

AECOM is conducting supplemental cultural resources studies for the above referenced project located on Yerba Buena Island, San Francisco County. Additional acreage of Yerba Buena Island has been added to the proposed project area. Please see the attached map for the general areas that have been added to the proposed project. These two sites have been added to the study area as they are needed to mitigate project effects including relocation of historic properties Quarters 10 and Building 267.

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Sincerely,

Patricia E. Ambacher  
Architectural Historian

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AECOM  
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Sacramento, CA 95811  
www.aecom.com

916.414.5800 tel  
916.414.5850 fax

January 18, 2011

Anthea Hartig, Ph.D.  
Director  
National Trust for Historic Preservation Western Office  
5 Third Street, Suite 707  
San Francisco, CA 94103

**Subject: Yerba Buena Westbound On- and Off-Ramps, San Francisco-Oakland Bay Bridge**

Dear Dr. Hartig:

AECOM is conducting supplemental cultural resources studies for the above referenced project located on Yerba Buena Island, San Francisco County. Additional acreage of Yerba Buena Island has been added to the proposed project area. Please see the attached map for the general areas that have been added to the proposed project. These two sites have been added to the study area as they are needed to mitigate project effects including relocation of historic properties Quarters 10 and Building 267.

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Sincerely,

Patricia E. Ambacher  
Architectural Historian

Enclosure





AECOM  
2020 L Street, Suite 400  
Sacramento, CA 95811  
www.aecom.com

916.414.5800 tel  
916.414.5850 fax

January 18, 2011

Cindy Heitzman  
Executive Director  
California Preservation Foundation  
5 Third Street, Suite 424  
San Francisco, CA 94103

**Subject: Yerba Buena Westbound On- and Off-Ramps, San Francisco-Oakland Bay Bridge**

Dear Ms. Heitzman:

AECOM is conducting supplemental cultural resources studies for the above referenced project located on Yerba Buena Island, San Francisco County. Additional acreage of Yerba Buena Island has been added to the proposed project area. Please see the attached map for the general areas that have been added to the proposed project. These two sites have been added to the study area as they are needed to mitigate project effects including relocation of historic properties Quarters 10 and Building 267.

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Sincerely,

Patricia E. Ambacher  
Architectural Historian

Enclosure



AECOM  
2020 L Street, Suite 400  
Sacramento, CA 95811  
www.aecom.com

916.414.5800 tel  
916.414.5850 fax

January 18, 2011

Christopher Layton  
President  
California Heritage Council  
P. O. Box 475046  
San Francisco, CA 94147

**Subject: Yerba Buena Westbound On- and Off-Ramps, San Francisco-Oakland Bay Bridge**

Dear Mr. Layton:

AECOM is conducting supplemental cultural resources studies for the above referenced project located on Yerba Buena Island, San Francisco County. Additional acreage of Yerba Buena Island has been added to the proposed project area. Please see the attached map for the general areas that have been added to the proposed project. These two sites have been added to the study area as they are needed to mitigate project effects including relocation of historic properties Quarters 10 and Building 267.

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Sincerely,

Patricia E. Ambacher  
Architectural Historian

Enclosure

January 18, 2011

Leigh Ann Baughman  
Executive Director  
San Francisco Beautiful  
564 Market Street, Suite 709  
San Francisco, CA 94104

**Subject: Yerba Buena Westbound On- and Off-Ramps, San Francisco-Oakland Bay Bridge**

Dear Ms. Baughman:

AECOM is conducting supplemental cultural resources studies for the above referenced project located on Yerba Buena Island, San Francisco County. Additional acreage of Yerba Buena Island has been added to the proposed project area. Please see the attached map for the general areas that have been added to the proposed project. These two sites have been added to the study area as they are needed to mitigate project effects including relocation of historic properties Quarters 10 and Building 267.

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Sincerely,



Patricia E. Ambacher  
Architectural Historian

Enclosure





AECOM  
2020 L Street, Suite 400  
Sacramento, CA 95811  
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916.414.5800 tel  
916.414.5850 fax

January 18, 2011

David Crosson  
Executive Director  
California Historical Society  
678 Mission Street  
San Francisco, CA 94105

**Subject: Yerba Buena Westbound On- and Off-Ramps, San Francisco-Oakland Bay Bridge**

Dear Mr. Crosson:

AECOM is conducting supplemental cultural resources studies for the above referenced project located on Yerba Buena Island, San Francisco County. Additional acreage of Yerba Buena Island has been added to the proposed project area. Please see the attached map for the general areas that have been added to the proposed project. These two sites have been added to the study area as they are needed to mitigate project effects including relocation of historic properties Quarters 10 and Building 267.

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Architectural Historian

Enclosure



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2020 L Street, Suite 400  
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916.414.5800 tel  
916.414.5850 fax

January 18, 2011

Erik Christoffersen  
Executive Director  
San Francisco Museum and Historical Society  
P.O. Box 420470  
San Francisco, CA 94142-0470

**Subject: Yerba Buena Westbound On- and Off-Ramps, San Francisco-Oakland Bay Bridge**

Dear Mr. Christoffersen:

AECOM is conducting supplemental cultural resources studies for the above referenced project located on Yerba Buena Island, San Francisco County. Additional acreage of Yerba Buena Island has been added to the proposed project area. Please see the attached map for the general areas that have been added to the proposed project. These two sites have been added to the study area as they are needed to mitigate project effects including relocation of historic properties Quarters 10 and Building 267.

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Sincerely,

Patricia E. Ambacher  
Architectural Historian

Enclosure



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2020 L Street, Suite 400  
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[www.aecom.com](http://www.aecom.com)

916.414.5800 tel  
916.414.5850 fax

January 18, 2011

Ron Ross  
President  
San Francisco History Association  
P. O. Box 31907  
San Francisco, CA 94131

**Subject: Yerba Buena Westbound On- and Off-Ramps, San Francisco-Oakland Bay Bridge**

Dear Mr. Ross:

AECOM is conducting supplemental cultural resources studies for the above referenced project located on Yerba Buena Island, San Francisco County. Additional acreage of Yerba Buena Island has been added to the proposed project area. Please see the attached map for the general areas that have been added to the proposed project. These two sites have been added to the study area as they are needed to mitigate project effects including relocation of historic properties Quarters 10 and Building 267.

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Sincerely,

Patricia E. Ambacher  
Architectural Historian

Enclosure





AECOM  
2020 L Street, Suite 400  
Sacramento, CA 95811  
www.aecom.com

916.414.5800 tel  
916.414.5850 fax

January 18, 2011

Tim Frye  
Acting Preservation Coordinator  
San Francisco Planning Department  
1650 Mission Street, Suite 400  
San Francisco, CA 94103

**Subject: Yerba Buena Westbound On- and Off-Ramps, San Francisco-Oakland Bay Bridge**

Dear Mr. Frye:

AECOM is conducting supplemental cultural resources studies for the above referenced project located on Yerba Buena Island, San Francisco County. Additional acreage of Yerba Buena Island has been added to the proposed project area. Please see the attached map for the general areas that have been added to the proposed project. These two sites have been added to the study area as they are needed to mitigate project effects including relocation of historic properties Quarters 10 and Building 267.

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Patricia E. Ambacher  
Architectural Historian

Enclosure



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2020 L Street, Suite 400  
Sacramento, CA 95811  
www.aecom.com

916.414.5800 tel  
916.414.5850 fax

January 18, 2011

Charles Chase  
President  
San Francisco Historic Preservation Commission  
1650 Mission Street, Suite 400  
San Francisco, CA 94103

**Subject: Yerba Buena Westbound On- and Off-Ramps, San Francisco-Oakland Bay Bridge**

Dear Mr. Chase:

AECOM is conducting supplemental cultural resources studies for the above referenced project located on Yerba Buena Island, San Francisco County. Additional acreage of Yerba Buena Island has been added to the proposed project area. Please see the attached map for the general areas that have been added to the proposed project. These two sites have been added to the study area as they are needed to mitigate project effects including relocation of historic properties Quarters 10 and Building 267.

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Patricia E. Ambacher  
Architectural Historian

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916.414.5800 tel  
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January 18, 2011

CWO Greg Ressio  
Engineering Department  
USCG Sector San Francisco  
1 Yerba Buena Island  
San Francisco, CA 94130

**Subject: Yerba Buena Westbound On- and Off-Ramps, San Francisco-Oakland Bay Bridge**

Dear Mr. Ressio:

AECOM is conducting supplemental cultural resources studies for the above referenced project located on Yerba Buena Island, San Francisco County. Additional acreage of Yerba Buena Island has been added to the proposed project area. Please see the attached map for the general areas that have been added to the proposed project. These two sites have been added to the study area as they are needed to mitigate project effects including relocation of historic properties Quarters 10 and Building 267.

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Patricia E. Ambacher  
Architectural Historian

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916.414.5800 tel  
916.414.5850 fax

January 18, 2011

An Bui  
BRAC PMO West  
1455 Frazee Road, Suite 900  
San Diego, CA 92108

**Subject: Yerba Buena Westbound On- and Off-Ramps, San Francisco-Oakland Bay Bridge**

Dear Mr. Bui:

AECOM is conducting supplemental cultural resources studies for the above referenced project located on Yerba Buena Island, San Francisco County. Additional acreage of Yerba Buena Island has been added to the proposed project area. Please see the attached map for the general areas that have been added to the proposed project. These two sites have been added to the study area as they are needed to mitigate project effects including relocation of historic properties Quarters 10 and Building 267.

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Sincerely,

A handwritten signature in black ink that reads "Patricia E. Ambacher". The signature is written in a cursive, flowing style.

Patricia E. Ambacher  
Architectural Historian

Enclosure



AECOM  
2020 L Street, Suite 400  
Sacramento, CA 95811  
www.aecom.com

916.414.5800 tel  
916.414.5850 fax

January 18, 2011

Mike Buhler  
Executive Director  
San Francisco Architectural Heritage  
2007 Franklin Street  
San Francisco, CA 94109

**Subject: Yerba Buena Westbound On- and Off-Ramps, San Francisco-Oakland Bay Bridge**

Dear Mr. Buhler:

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Sincerely,

Patricia E. Ambacher  
Architectural Historian

Enclosure





STATE OF CALIFORNIA

Edmund G. Brown Jr., Governor

## NATIVE AMERICAN HERITAGE COMMISSION

915 CAPITOL MALL, ROOM 364  
SACRAMENTO, CA 95814  
(916) 858-4082  
Fax (916) 657-5380  
Web Site [www.nahc.ca.gov](http://www.nahc.ca.gov)



February 3, 2011

Patricia E. Ambacher  
AECOM  
2020 L St., suite 400  
Sacramento, CA 95811

Sent by Fax: 916-414-5850  
Number of Pages: 2

Re: Proposed Yerba Buena Island Interchange project, San Francisco County

Dear Ms. Ambacher:

A record search of the sacred land file has failed to indicate the presence of Native American cultural resources in the immediate project area. The absence of specific site information in the sacred lands file does not indicate the absence of cultural resources in any project area. Other sources of cultural resources should also be contacted for information regarding known and recorded sites.

Enclosed is a list of Native Americans individuals/organizations who may have knowledge of cultural resources in the project area. The Commission makes no recommendation or preference of a single individual, or group over another. This list should provide a starting place in locating areas of potential adverse impact within the proposed project area. I suggest you contact all of those indicated, if they cannot supply information, they might recommend others with specific knowledge. By contacting all those listed, your organization will be better able to respond to claims of failure to consult with the appropriate tribe or group. If a response has not been received within two weeks of notification, the Commission requests that you follow-up with a telephone call to ensure that the project information has been received.

If you receive notification of change of addresses and phone numbers from any of these individuals or groups, please notify me. With your assistance we are able to assure that our lists contain current information. If you have any questions or need additional information, please contact me at (916) 653-4038.

Sincerely,

A handwritten signature in cursive script, appearing to read "Debbie Pilas-Treadway".

Debbie Pilas-Treadway  
Environmental Specialist III

**Native American Contacts**  
**San Francisco County**  
**February 3, 2011**

Jakki Kehl  
 720 North 2nd Street  
 Patterson, CA 95363  
 jakki@bigvalley.net  
 (209) 892-1060

Ohlone/Costanoan

Muwekma Ohlone Indian Tribe of the SF Bay Area

Rosemary Cambra, Chairperson

PO Box 360791

Milpitas, CA 95036

muwekma@muwekma.org

408-434-1668

408-434-1673

Ohlone / Costanoan

Linda G. Yamane  
 1585 Mira Mar Ave  
 Seaside, CA 93955  
 rumsien123@yahoo.com  
 831-394-5915

Ohlone/Costanoan

The Ohlone Indian Tribe

Andrew Galvan

PO Box 3152

Fremont, CA 94539

chochenyo@AOL.com

(510) 882-0527 - Cell

(510) 687-9393 - Fax

Ohlone/Costanoan

Bay Miwok

Plains Miwok

Patwin

Amah/Mutsun Tribal Band  
 Irene Zwierlein, Chairperson  
 789 Canada Road  
 Woodside, CA 94062  
 amah\_mutsun@yahoo.com  
 (650) 851-7747 - Home  
 (650) 851-7489 - Fax

Ohlone/Costanoan

Trina Marine Ruano Family

Ramona Garibay, Representative

30940 Watkins Street

Union City, CA 94587

soaprootmo@msn.com

510-972-0645-home

209-688-4753-cell

Ohlone/Costanoan

Bay Miwok

Plains Miwok

Patwin

Amah/Mutsun Tribal Band  
 Jean-Marie Feyling  
 19350 Hunter Court  
 Redding, CA 96003  
 jmfgmc@sbcglobal.net  
 530-243-1633

Ohlone/Costanoan

Indian Canyon Mutsun Band of Costanoan

Ann Marie Sayers, Chairperson

P.O. Box 28

Hollister, CA 95024

ams@indiancanyon.org

831-637-4238

Ohlone/Costanoan

This list is current only as of the date of this document.

Distribution of this list does not relieve any person of statutory responsibility as defined in Section 7050.5 of the Health and Safety Code, Section 5097.94 of the Public Resources Code and Section 5097.98 of the Public Resources Code.

This list is only applicable for contacting local Native Americans with regard to cultural resources for the proposed Yerba Buena Island Interchange project, San Francisco County

**Ambacher, Patricia**

---

**From:** Ambacher, Patricia  
**Sent:** Thursday, February 03, 2011 4:26 PM  
**To:** 'rumsien123@yahoo.com'  
**Subject:** Yerba Buena Island Interchange Project – Supplemental Information

February 3, 2011

Linda G. Yamane  
1585 Mira Mar Ave.  
Seaside, CA 93955

Dear Ms. Yamane:

**Subject: Yerba Buena Island Interchange Project – Supplemental Information**

AECOM is conducting cultural resources studies for the above-referenced project located on Yerba Buena Island, San Francisco County and is shown on the attached portion of the USGS topographic quadrangle map.

We are pleased to bring this activity to your attention, and would appreciate any information you can provide regarding prehistoric, historic, or ethnographic Native American land use. We are also interested in any contemporary Native American values that may be present near or within the project area.

If you have any questions or comments feel free to contact Mark Bowen by email at [Mark.Bowen@aecom.com](mailto:Mark.Bowen@aecom.com), or by phone at 916.414.5800. You may also contact Senior Archaeologist Brian Ludwig at [Brian.Ludwig@aecom.com](mailto:Brian.Ludwig@aecom.com) or by phone at 916.414.5886. We look forward to hearing from you soon and hope we will have the opportunity to work together on this project.

Sincerely,

Patricia Ambacher  
Architectural Historian

Hard Copy to Follow





AECOM  
2020 L Street, Suite 400  
Sacramento, CA 95811  
www.aecom.com

916.414.5800 tel  
916.414.5850 fax

February 3, 2011

Linda G. Yamane  
1585 Mira Mar Ave.  
Seaside, CA 93955

**Subject: Yerba Buena Island Interchange Project – Supplemental Information**

Dear Ms. Yamane:

AECOM is conducting cultural resources studies for the above-referenced project located on Yerba Buena Island, San Francisco County and is shown on the attached portion of the USGS topographic quadrangle map.

We are pleased to bring this activity to your attention, and would appreciate any information you can provide regarding prehistoric, historic, or ethnographic Native American land use. We are also interested in any contemporary Native American values that may be present near or within the project area.

If you have any questions or comments feel free to contact Mark Bowen by email at Mark.Bowen@aecom.com, or by phone at 916.414.5800. You may also contact Senior Archaeologist Brian Ludwig at Brian.Ludwig@aecom.com or by phone at 916.414.5886. We look forward to hearing from you soon and hope we will have the opportunity to work together on this project.

Sincerely,

Patricia E. Ambacher  
Architectural Historian

Enclosure

**Ambacher, Patricia**

---

**From:** Ambacher, Patricia  
**Sent:** Thursday, February 03, 2011 4:29 PM  
**To:** 'jmfgmc@sbcglobal.net'  
**Subject:** Yerba Buena Island Interchange Project – Supplemental Information

February 3, 2011

Jean-Marie Feyling  
19350 Hunter Court  
Redding, CA 96003

**Subject: Yerba Buena Island Interchange Project – Supplemental Information**

Dear Ms. Feyling:

AECOM is conducting cultural resources studies for the above-referenced project located on Yerba Buena Island, San Francisco County and is shown on the attached portion of the USGS topographic quadrangle map.

We are pleased to bring this activity to your attention, and would appreciate any information you can provide regarding prehistoric, historic, or ethnographic Native American land use. We are also interested in any contemporary Native American values that may be present near or within the project area.

If you have any questions or comments feel free to contact Mark Bowen by email at [Mark.Bowen@aecom.com](mailto:Mark.Bowen@aecom.com), or by phone at 916.414.5800. You may also contact Senior Archaeologist Brian Ludwig at [Brian.Ludwig@aecom.com](mailto:Brian.Ludwig@aecom.com) or by phone at 916.414.5886. We look forward to hearing from you soon and hope we will have the opportunity to work together on this project.

Sincerely,

Patricia Ambacher  
Architectural Historian

**Hard Copy To Follow**



AECOM  
2020 L Street, Suite 400  
Sacramento, CA 95811  
www.aecom.com

916.414.5800 tel  
916.414.5850 fax

February 3, 2011

Jean-Marie Feyling  
Amah/Mutsun Tribal Band  
19350 Hunter Court  
Redding, CA 96003

**Subject: Yerba Buena Island Interchange Project – Supplemental Information**

Dear Ms. Feyling:

AECOM is conducting cultural resources studies for the above-referenced project located on Yerba Buena Island, San Francisco County and is shown on the attached portion of the USGS topographic quadrangle map.

We are pleased to bring this activity to your attention, and would appreciate any information you can provide regarding prehistoric, historic, or ethnographic Native American land use. We are also interested in any contemporary Native American values that may be present near or within the project area.

If you have any questions or comments feel free to contact Mark Bowen by email at Mark.Bowen@aecom.com, or by phone at 916.414.5800. You may also contact Senior Archaeologist Brian Ludwig at Brian.Ludwig@aecom.com or by phone at 916.414.5886. We look forward to hearing from you soon and hope we will have the opportunity to work together on this project.

Sincerely,

Patricia E. Ambacher  
Architectural Historian

Enclosure





## **ATTACHMENT D**

---

SHPO Correspondence





**OFFICE OF HISTORIC PRESERVATION  
DEPARTMENT OF PARKS AND RECREATION**

P.O. BOX 942896  
SACRAMENTO, CA 94296-0001  
(916) 653-6624 Fax: (916) 653-9824  
calshpo@ohp.parks.ca.gov  
www.ohp.parks.ca.gov



February 8, 2010

Reply To: FHWA080922E

Anmarie Medin, Chief  
Cultural and Community Studies Office  
Caltrans Division of Environmental Analysis  
PO Box 942874  
Sacramento, CA 94274-0001

Re: Findings of Effect for the Proposed Yerba Buena Island Ramps Improvement  
Project, San Francisco County, CA

Dear Ms. Medin:

Thank you for consulting with me about the subject undertaking in accordance with the *Programmatic Agreement Among the Federal Highway Administration, the Advisory Council on Historic Preservation, the California State Historic Preservation Officer, and the California Department of Transportation Regarding Compliance with Section 106 of the National Historic Preservation Act, as it Pertains to the Administration of the Federal-Aid Highway Program in California (PA)*.

The Federal Highway Administration (FHWA) has determined that the proposed project will have an adverse effect on historic properties. Based on my review of the proposed documentation, I concur.

Thank you for considering historic properties as part of your project planning. If you have any questions, please contact Natalie Lindquist of my staff at your earliest convenience at (916) 654-0631 or e-mail at [nlindquist@parks.ca.gov](mailto:nlindquist@parks.ca.gov).

Sincerely,

*Susan H Stratton for*

Milford Wayne Donaldson, FAIA  
State Historic Preservation Officer



**BECAUSE OF CALTRANS'S OBLIGATION TO PROTECT ARCHAEOLOGICAL  
SITES, THE ARCHAEOLOGICAL SURVEY REPORT IS NOT AVAILABLE FOR  
PUBLIC DISTRIBUTION.**

Confidentiality of Archaeological Information

The following codes provide justification for not releasing information regarding archaeological sites to the public.

- Government Code section 6254.10; rationale set forth in section 6254 r
- Rationale set forth in cases such as Johnson v. Winter (App.1 Dist1982) 179 Cal.Rptr.585, 127 Cal. App.3d 435 and Black Panther party v. Kehoe (App. 3 Dist.1974)117Cal.Rptr. 106, 42 Cal. App. 3d 645.





HISTORIC PROPERTY SURVEY REPORT  
YERBA BUENA ISLAND RAMPS IMPROVEMENT PROJECT  
YERBA BUENA ISLAND, SAN FRANCISCO COUNTY, CALIFORNIA  
04-SF-80-PM 7.6/8.1

EA 04-3A640K

Prepared by:

EDAW  
2022 J Street  
Sacramento, California 95814  
(916) 414-5800  
February 26, 2009

Prepared by:



Mark Bowen, Senior Historian/ Architectural Historian

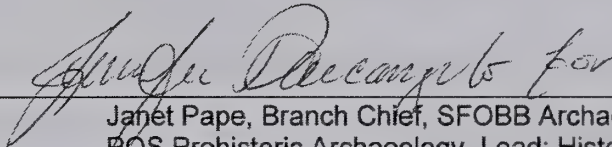
9/23/09

Date

Prepared for:

Eric Cordoba, Project Manager  
SFCTA  
100 Van Ness Avenue, 26th Floor  
San Francisco, CA 94102

Approved by:

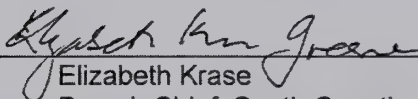


Janet Pape, Branch Chief, SFOBB Archaeology  
PQS Prehistoric Archaeology, Lead; Historical Archaeology, Co-PI  
Office of Cultural Resources Studies  
Caltrans District 4  
111 Grand Avenue, P.O. Box 23660  
Oakland, California, 94623

Date

10/22/09

Approved by:



Elizabeth Krase  
Branch Chief, South Counties  
Office of Cultural Resources Studies  
Caltrans District 4  
111 Grand Avenue, P.O. Box 23660  
Oakland, California, 94623

Date

10/22/09

September, 2009





**HISTORIC PROPERTY SURVEY REPORT****1. UNDERTAKING DESCRIPTION AND LOCATION**

District	County	Route (Local Agency)	Local Assistance Project Prefix	Post Miles (Project No.)	Charge Unit (Agreement)	Expenditure Authorization (Location)
04	SF	I-80		7.6 - 8.1	L1C0	04-3A640K

(For Local Assistance projects off the highway system, use headers in italics)

**Project Description:**

(Insert project description here; refer reader to location and vicinity maps in HPSR)

Yerba Buena Island (YBI) is located in the San Francisco Bay approximately halfway between Oakland and San Francisco. YBI is only accessible to vehicular traffic via the San Francisco Oakland Bay Bridge (SFOBB) stretch of I-80. The SFOBB is considered a "lifeline structure" and is a critical link between the East Bay and San Francisco. It provides the only vehicle access to YBI, the active U.S. Coast Guard (USCG) facilities located on the south side of the island, and Treasure Island, located immediately north of YBI.

The proposed project would replace the existing westbound on- and off-ramps located on the east side of YBI with new westbound on- and off-ramps. The new ramps would maintain the functional role of the current ramps while satisfying seismic requirements, highway design standards, traffic operations, and improve safety. The YBI Ramps Improvement Project is independent of both the SFOBB East Span Seismic Safety Project, currently under construction, and the Treasure Island and Yerba Buena Island (TI/YBI) Redevelopment Plan, currently undergoing its own environmental review process.

The purpose of the project is to improve the safety of the westbound on- and off-ramps to the extent physically and economically feasible. The current ramps do not meet current Caltrans design standards. The proposed project would provide standard deceleration length for the off-ramp and improved acceleration/merging length for the on-ramp. In addition, the project would improve traffic operations to and from YBI.

Alternatives have been proposed to address the geometric deficiencies of the existing on- and off-ramps. In addition to the no-build alternative, the proposed build alternatives would analyze the effects to the SFOBB (I-80) mainline structure and YBI. The proposed project is located between post-mile (PM) 7.6 and 8.1<sup>1</sup> beginning at the east portal of the YBI tunnel and ending at the east side of the Transition Structure portion of the new SFOBB. The SFOBB Transition Structure is located between PM 7.9 and 8.1 between the YBI tunnel and the SFOBB Self-Anchored Suspension (SAS) span.<sup>2</sup>

Three alternatives are currently under consideration, including:

- **No Build Alternative**

This Alternative assumes that the existing on- and off-ramps would remain in place and no further action or improvements would occur.

<sup>1</sup> Kilometer Post (KP) 12.3 and 13.2

<sup>2</sup> The SFOBB Transition Structure is the name of a section of the new Bay Bridge. The Transition Structure will connect the Self-Anchored Suspension (SAS) span to Yerba Buena Island, and will transition the East Span's side-by-side road decks to the upper and lower decks of the YBI tunnel and West Span.

## HISTORIC PROPERTY SURVEY REPORT

- **Alternative 2b**

Alternative 2b would include removal of the existing westbound on- and off-ramps on the east side of YBI, construction of a westbound loop on-ramp from Macalla Road on the east side of YBI, and construction of a westbound off-ramp to Macalla Road on the east side of YBI.

This alternative proposes to reconstruct two of the existing six on- and off-ramps at the I-80/YBI interchange. The proposed on- and off-ramps would provide standard shoulder widths, and would include the following features:

- Westbound on-ramp on the east side of YBI- This ramp would begin at a "T" intersection at Macalla Road, loop right with a tight radius, and merge on to the north side of the Bay Bridge. The length of this ramp would be approximately 876 feet (267 meters). This ramp would have two traffic lanes, merging into one as it connects to the SFOBB. One lane would be a high occupancy vehicle (HOV) lane and the other a mixed-flow lane.
- Westbound off-ramp on the east side of YBI - This ramp would diverge from the new SFOBB Transition Structure between bents W3 and W4 curving around the Nimitz House and terminate at a "T" intersection at Macalla Road. The length of this ramp would be approximately 1,115 feet (340 meters). A stop sign is proposed at the ramp terminus.
- Macalla Road would be widened for approximately 660 feet adjacent to the terminus of the westbound on- and off-ramps. The existing roadway is about 20 feet wide near the ramp terminus. The roadway widening is required to accommodate a 12-foot wide multi-use pedestrian/bike path and two 12-foot wide lanes within the Caltrans right-of-way. A retaining wall would be constructed adjacent to Macalla Road to provide the required width. The height of the retaining wall would vary from 4 to 16 feet and would retain the hillside above Macalla Road. The stairway adjacent to the Caltrans Substation would be relocated to the west side of the building to make room for the new retaining wall. The roadway width would vary around the curve at South Gate Road to provide proper width for truck turning movements.
- Under Alternative 2B, the westbound on- and off-ramps would terminate at Macalla Road where Quarters 10 and Building 267 are currently located.<sup>3</sup> Quarters 10 and Building 267 would be relocated prior to construction of the ramps at Macalla Road. The relocation site for these buildings would be on YBI and would be determined under the Section 106 mitigation development process.

- **Alternative 4**

Alternative 4 would include the removal of the existing westbound on- and off-ramps on the east side of YBI, construction of westbound on-ramp from South Gate Road, and construction of westbound off-ramp to Macalla Road on the east side of YBI.

This alternative proposes to reconstruct two of the existing six on- and off-ramps at the I-80/YBI

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<sup>3</sup> Quarters 10 and Building 267 (a contributing garage) are listed in the National Register of Historic Places and significant at the local level under Criterion C, as a significant example of mid-twentieth century residential architecture.

---

For the federal undertaking described in Part 1: To minimize redundancy and paperwork for the California Department of Transportation and the State Historic Preservation Officer, and in the spirit intended under the federal Paperwork Reduction Act (U.S.C. 44 Chapter 35), this document also satisfies consideration under California Environmental Quality Act Guidelines Section §15064.5(a) and, as appropriate, Public Resources Code §5024 (a)(b) and (d).



## HISTORIC PROPERTY SURVEY REPORT

interchange. The proposed on- and off-ramps would provide standard shoulder widths, and would include the following features:

- Westbound on-ramp on the east side of YBI - This ramp would begin at South Gate Road, proceed east paralleling the eastbound on-ramp, loop under the new SFOBB Transition Structure near its eastern end to provide adequate merging distances, cross over the westbound off-ramp along the north side of the Bay Bridge. The length of this ramp would be approximately 2,883 feet (879 meters). HOV lane would not be provided under Alternative 4.
- Westbound off-ramp on the east side of YBI - This ramp would diverge from the new SFOBB Transition Structure between bents W2 and W3, parallel the Transition Structure, cross under the westbound on-ramp and terminate at a "T" intersection at Macalla Road. The length of this ramp would be approximately 1,168 feet (356 meters). A stop sign is proposed at the ramp terminus.
- Macalla Road would be widened for approximately 660 feet adjacent to the terminus of the westbound on-and off-ramps. The existing roadway is about 20 feet wide near the ramp terminus. The roadway widening is required to accommodate a 12-foot wide multi-use pedestrian/bike path and two 12-foot wide lanes within the Caltrans right-of-way. A retaining wall would be constructed adjacent to Macalla Road to provide the required width. The height of the retaining wall would vary from 4 to 16 feet and would retain the hillside above Macalla Road. The roadway width would vary around the curve at South Gate Road to provide proper width for truck turning movements.
- Under Alternative 4, Quarters 10 and Building 267 and its associated landscaping would remain in place.

## 2. AREA OF POTENTIAL EFFECTS

The Area of Potential Effects (APE) for the project was established in consultation with Janet Pape, Caltrans District 4 Archaeologist, Mary K. Smith, Caltrans District 4 Architectural Historian, and Jack Siau, Project Manager/Local Assistance Engineer, on 10/21/08, 10/23/08, and 10/24/08. The APE maps (Maps 2, 3, and 4) are located in Attachment A in this Historic Property Survey Report.

The archaeological APE (Map 3) was established as generally following the maximum possible area of direct impact resulting from the proposed project, including all new construction, easements, and staging areas.

Consistent with Caltrans policies and general cultural resource practices, the area for potential effect for the built environment (Map 4) encompassed areas that might be either directly or indirectly affected by construction; i.e., those areas within which the project could cause a change in character or use of historic properties. Only those resources located within the architectural APE were included in the survey.

The APE for historic architectural resources includes two areas: a General APE (Map 2) and Focused APE (Map 4). The General APE was developed to encompass both the project area, and the contributing elements of the large, multi-component SFOBB historic property that extend outside of the project area. The Focused APE encompasses only the project area; therefore, those portions of the SFOBB property that may be potentially affected by the Project are included. A small segment of the westernmost portion of the East Span is extant within the Focused APE.

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For the federal undertaking described in Part 1: To minimize redundancy and paperwork for the California Department of Transportation and the State Historic Preservation Officer, and in the spirit intended under the federal Paperwork Reduction Act (U.S.C. 44 Chapter 35), this document also satisfies consideration under California Environmental Quality Act Guidelines Section §15064.5(a) and, as appropriate, Public Resources Code §5024 (a)(b) and (d).



**HISTORIC PROPERTY SURVEY REPORT****3. CONSULTING PARTIES / PUBLIC PARTICIPATION****x Local Government**

- San Francisco Planning Department. Mark Luellen, Preservation Coordinator. Letter Sent December 11, 2008
- San Francisco County Transportation Authority. Eric Cordoba, Project Manager.

**x Native American Tribes, Groups and Individuals**

- Letters sent on December 17, 2008. No response received as of February 18, 2009. See ASR Appendix C.
- Jakki Kehl
- Amah/Matsun Tribal Band
- Indian Canyon Band of Costanoan
- Muwekma Ohlone Indian Tribe of the SF Bay Area
- The Ohlone Indian Tribe
- Trina Marine Ruano Family

**x Native American Heritage Commission**

- Request for search of files: November 7, 2008. Response November 13, 2008.

**x Local Historical Society / Historic Preservation Group**

- San Francisco Architectural Heritage. Letter Sent December 11, 2008. No response as of Feb 16, 2009
- San Francisco Landmark Preservation Advisory Board. Letter Sent December 11, 2008. No response as of Feb 16, 2009
- San Francisco History Association. Letter Sent December 11, 2008. No response as of Feb 16, 2009
- San Francisco Museum and Historical Society. Letter Sent December 11, 2008. No response as of Feb 16, 2009
- California Historical Society. Letter Sent December 11, 2008. No response as of Feb 16, 2009
- San Francisco Beautiful. Letter Sent December 11, 2008. No response as of Feb 16, 2009
- California Heritage Council. Letter Sent December 11, 2008. No response as of Feb 16, 2009
- California Preservation Foundation. Letter Sent December 11, 2008. No response as of Feb 16, 2009
- National Trust for Historic Preservation Western Office. Letter Sent December 11, 2008. No response as of Feb 16, 2009
- National Park Service, Pacific West Region Office. Letter Sent December 11, 2008. No response as of Feb 16, 2009
- Oakland Heritage Alliance. Letter Sent December 11, 2008. No response as of Feb 16, 2009
- Oakland Landmarks Preservation Advisory Board. Letter Sent December 11, 2008. No response as of Feb 16, 2009
- Oakland Cultural Heritage Survey. Letter Sent December 11, 2008. No response as of Feb 16, 2009
- Alameda County Historical Society. Letter Sent December 11, 2008. No response as of Feb 16, 2009
- Alameda County Parks, Recreation, and Historical Commission. Letter Sent December 11, 2008. No response as of Feb 16, 2009

**x Public Information Meetings**

- Public Scoping Meeting. Location: Port of San Francisco office, Bayside Conference Room. Pier 1, The Embarcadero, San Francisco, CA 94111. Date: September 24, 2008 from 6:30 to

For the federal undertaking described in Part 1: To minimize redundancy and paperwork for the California Department of Transportation and the State Historic Preservation Officer, and in the spirit intended under the federal Paperwork Reduction Act (U.S.C. 44 Chapter 35), this document also satisfies consideration under California Environmental Quality Act Guidelines Section §15064.5(a) and, as appropriate, Public Resources Code §5024 (a)(b) and (d).

## HISTORIC PROPERTY SURVEY REPORT

8:00 p.m.

- Coordination plan letters sent out on September 18, 2008.

### 4. SUMMARY OF IDENTIFICATION EFFORTS

<input checked="" type="checkbox"/> National Register of Historic Places	Month & Year: 1979-2002 & supplements
<input checked="" type="checkbox"/> California Register of Historical Resources	Year: 1992 & supplemental information to date
<input checked="" type="checkbox"/> California Inventory of Historic Resources	Year: 1976
<input checked="" type="checkbox"/> California Historical Landmarks	Year: 1995 & supplemental information to date
<input checked="" type="checkbox"/> California Points of Historical Interest	Year: 1992 & supplemental information to date
<input type="checkbox"/> State Historic Resources Commission	Not Applicable
<input checked="" type="checkbox"/> Caltrans Historic Highway Bridge Inventory	Year: 2006 & supplemental information to date
<input checked="" type="checkbox"/> Archaeological Site Records	

- Northwest Information Center, records search on November 24, 2008.

☐ Other sources consulted

☒ Results:

The NWIC record search demonstrated that a total of 23 cultural resources investigations have been conducted within and in the vicinity (approximately 1 mile radius) of the project APE. Prior to the efforts outlined in this current Archaeological Survey Report, there were at least 8 studies that have occurred directly within the Yerba Buena Island Ramps Improvement Project APE; the earliest documented investigations conducted within the vicinity of the project area APE consist of Rudo (1982) and Roop (1984). With the exception of Rudo's thesis, each of these prior studies was related to Caltrans' seismic retrofit of the Bay Bridge and the Navy's privatization efforts regarding Yerba Buena Island.

The majority of the 8 studies conducted within the Yerba Buena Island Ramps Improvement Project APE consisted primarily of archaeological investigations and treatment plans. Almost the entire APE was subjected to complete survey coverage by PAR in 1996. A large portion of the APE was also previously surveyed in 1995 by Glenn Gmoser. These previous studies revealed that one archaeological site, CA-SFR-04/H, had been recorded within the YBI APE. One historical archaeological resource, P-38-004322, which consists of sections of a retaining wall and weir with inscriptions by prisoners-of-war who built it in the 1940s, is located outside the APE. This resource was evaluated to be ineligible for inclusion in the National Register (Supernowicz 2003). See ASR for Archaeological site record citations.

### 5. PROPERTIES IDENTIFIED

- ☒ Caltrans Architectural Historian, Mary K. Smith, who meets the Professionally Qualified Staff Standards in Section 106 Programmatic Agreement Attachment 1 as an Architectural Historian, has determined that the only/only other properties present within the APE meet the criteria for Section 106 PA Attachment 4 (**Properties Exempt from Evaluation**).
- ☒ Caltrans, as assigned by FHWA, has determined that the following **archaeological sites** within the Project APE shall be considered eligible for inclusion in the National Register without conducting subsurface testing or surface collection within the APE, for which the **establishment of an ESA** will protect the sites from any potential effects, in accordance with Section 106 PA Stipulation VIII.C. See attached documentation.

For the federal undertaking described in Part 1: To minimize redundancy and paperwork for the California Department of Transportation and the State Historic Preservation Officer, and in the spirit intended under the federal Paperwork Reduction Act (U.S.C. 44 Chapter 35), this document also satisfies consideration under California Environmental Quality Act Guidelines Section §15064.5(a) and, as appropriate, Public Resources Code §5024 (a)(b) and (d).



**HISTORIC PROPERTY SURVEY REPORT**

- CA-SFr-04/H DOE 8/13/1998
- ☒ Properties **previously listed or determined eligible** for inclusion in the National Register of Historic Places are present within the Project APE. *(Include date of listing or determination):*
  - CA-SFr-04/H DOE 8/13/1998
  - Quarters 8 DOE September 1998
  - Quarters 10 (and contributing Building 267) Listed 2/26/08
  - The Senior Officers Historic District Listed 2/26/2008
  - San Francisco Oakland Bay Bridge Listed 8/13/01

**6. LIST OF ATTACHED DOCUMENTATION**

- ☒ Project Vicinity, Location, and APE Maps (Attachment A)
- ☒ California Historic Bridge Inventory sheet (Attachment B)
- ☒ Historical Resources Evaluation Report (HRER)
  - JRP Historical Consulting, LLC, May 2009, prepared by Toni Webb; peer reviewed by Mary K. Smith, Caltrans PQS Principal Architectural Historian (Attachment C)
- ☒ Archaeological Survey Report (ASR)
  - EDAW, June 2009, prepared by Brian Ludwig and Charlane Gross; peer reviewed by Janet Pape, Caltrans, PQS Prehistoric Archaeology, Lead; Historical Archaeology, Co PI (Attachment D)
- ☐ Archaeological Evaluation Report (CARIDAP, XPI, PII, PIII)
  - Not Applicable

**7. HPSR to File**

- ☒ **No properties requiring evaluation** are present within the Project APE.

**8. HPSR to SHPO**

- ☒ Not applicable.

**9. Findings for State-Owned Properties**

- ☒ Caltrans has determined that the following **State-owned buildings and structures previously included in the Master List of Historical Resources** are within the Project APE.
  - East Span San Francisco – Oakland Bay Bridge 33-0025
- ☒ Caltrans has determined that this project will have **no effect** on **state-owned buildings and structures** within the Project APE that meet National Register and/or California Historical Landmarks eligibility criteria and is providing notice and summary to SHPO pursuant to PRC §5024(f). [Bridge 33-0025 will not be present when subject project is undertaken: See HRER]

**10. CEQA IMPACT FINDINGS**

*(Check all that apply. Consultation with SHPO is not required under CEQA. This instruction line and findings that are not applicable may be deleted)*

- ☒ Not applicable; Caltrans is not the lead agency under CEQA.



**HISTORIC PROPERTY SURVEY REPORT****11. HPSR PREPARATION AND DEPARTMENT APPROVAL**

Prepared by: (sign on line)



9/17/09

Consultant / discipline:

Mark Bowen, Architectural Historian

Date

Affiliation

EDAW, Sacramento, CA

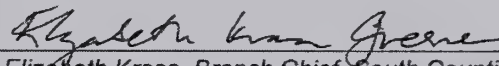
Reviewed for approval by:



10/22/09

District 4 Caltrans PQS  
discipline/level:Janet Pape, Branch Chief, SFOBB Archaeology  
PQS Prehistoric Archaeology, Lead; Historical  
Archaeology, Co-PI  
Office of Cultural Resource Studies  
Caltrans District 4

Date



10/22/09

Elizabeth Krase, Branch Chief, South Counties  
PQS Principal Architectural Historian  
Office of Cultural Resource Studies  
Caltrans District 4

Date



## **ATTACHMENT A**

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Maps





**Map 1:**  
Project Vicinity and Location

Yerba Buena Island  
Ramps Improvement Project



Portion of USGS topographic quadrangles  
Oakland West and San Francisco North

Project Location

Transition Structure Portion of SFOBB

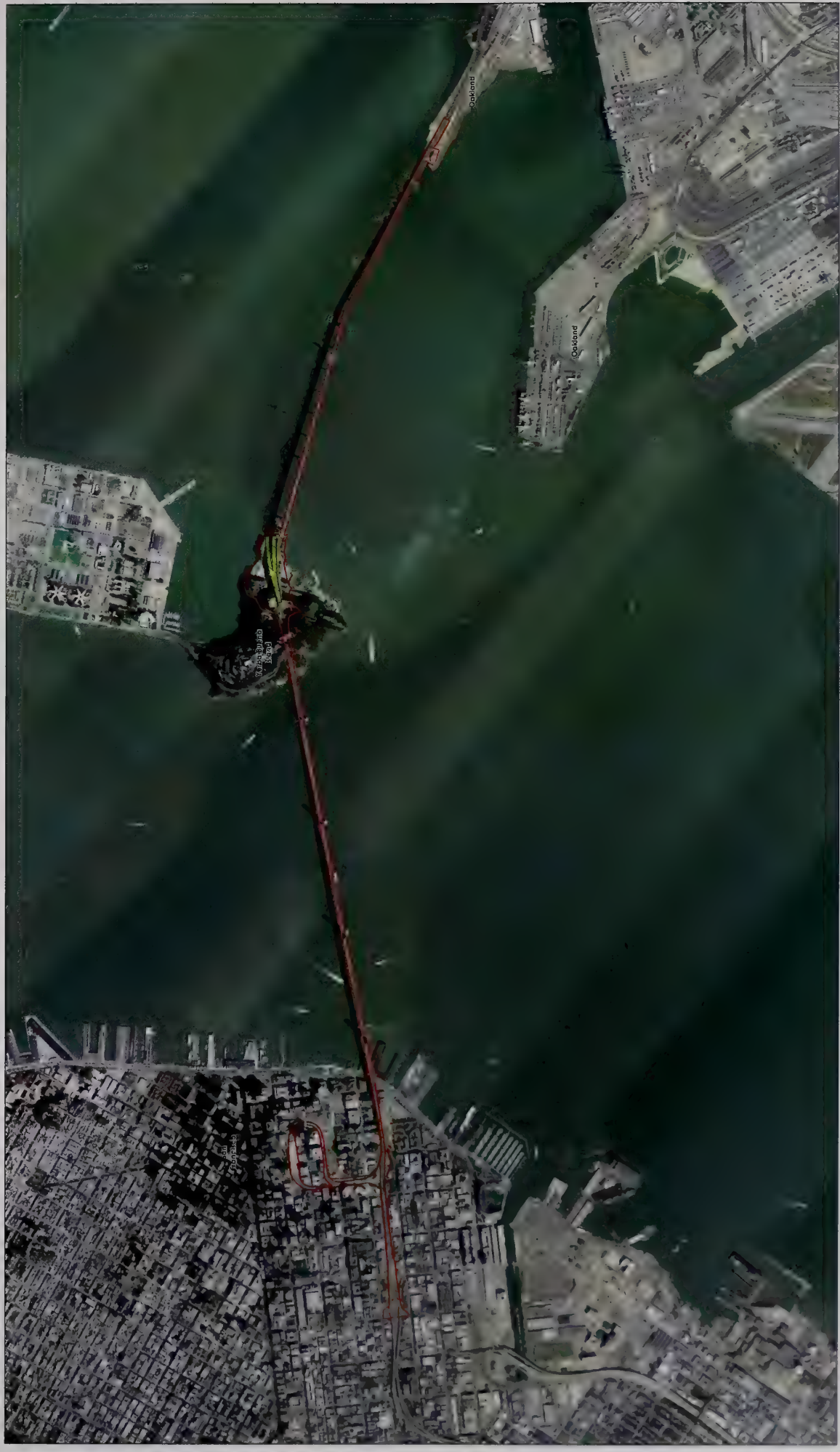
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Scale





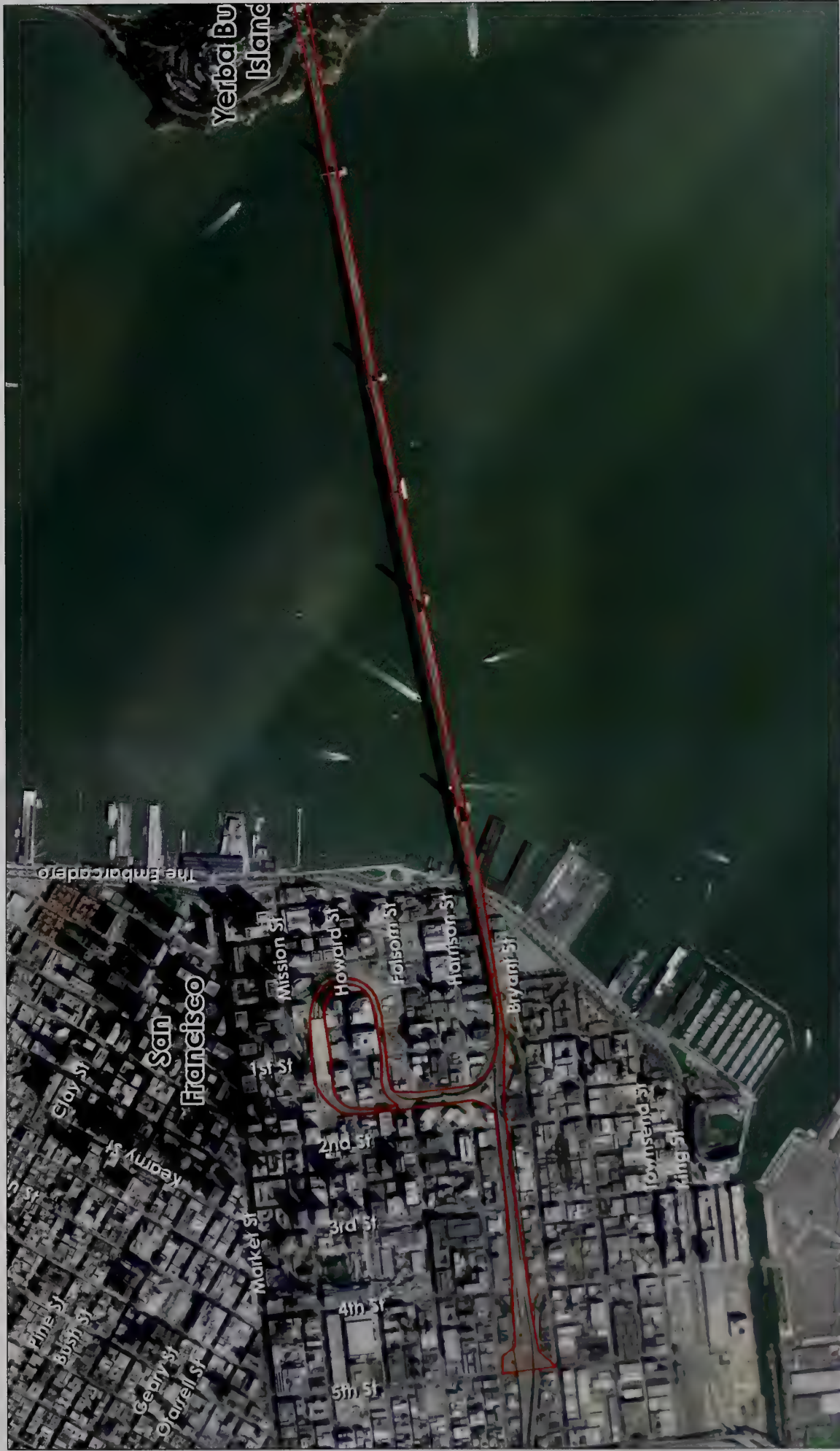
Map 2:  
General Architectural Area of Potential Effects







Map 2a:  
General Architectural Area of Potential Effects



1 inch = 1,000 feet

0.5 Miles

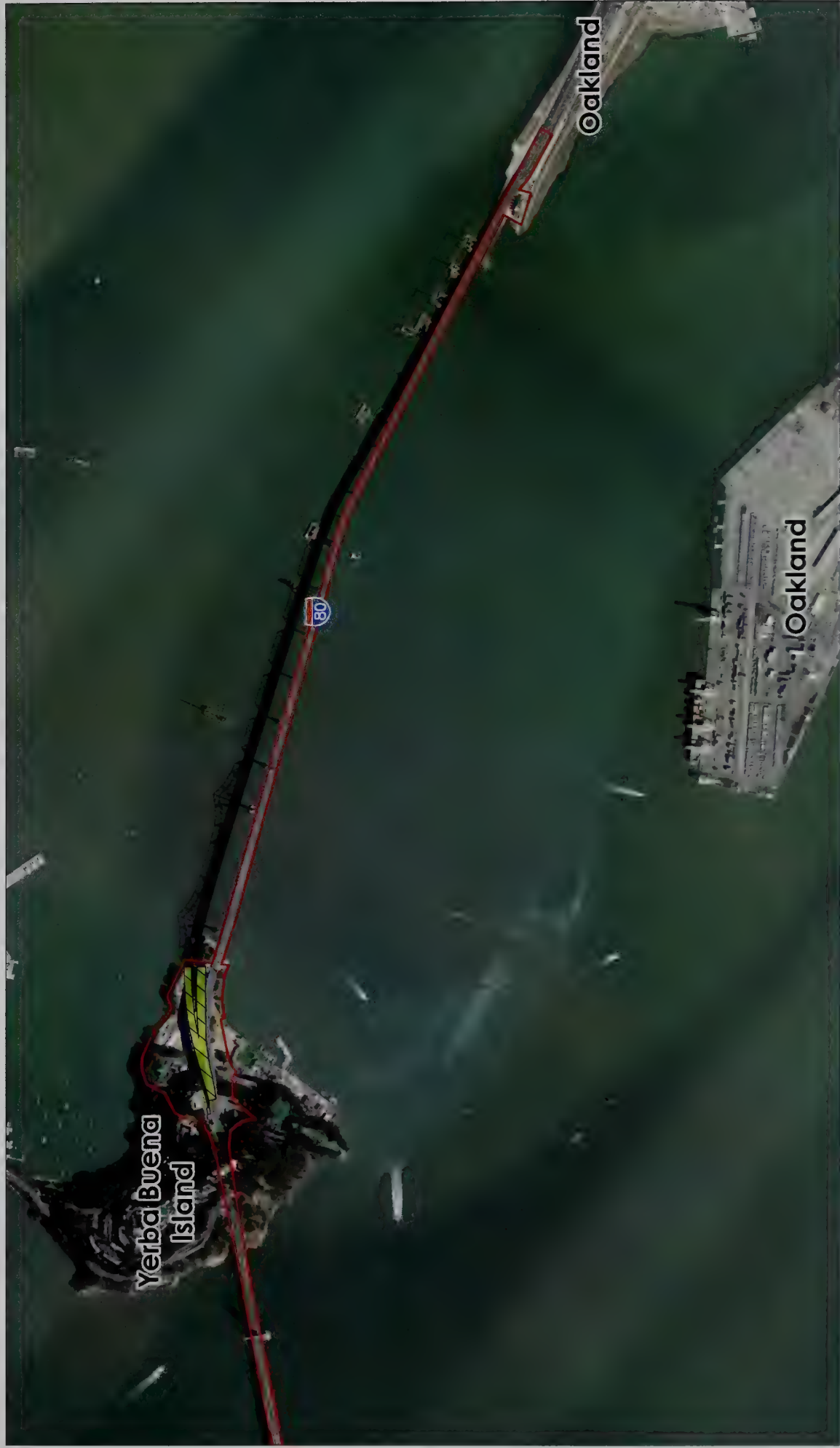
Transition Structure Portion of SFOBB

Area of Potential Effects





Map 2b:  
General Architectural Area of Potential Effects







**Map 3a: Alternative 2b  
Archeological Area of Potential Effect**

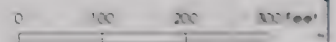
Yerba Buena Island  
Ramps Improvement Project



	10/21/08
Callans Project Manager	Date
	10/21/08
Callans Archeologist	Date
	10/21/08
Callans Project Manager	Date

- Alternative 2b Proposed Ramps**
- Proposed West Bound Off-Ramp
  - Proposed West Bound On-Ramp
  - Proposed Macalla Road Improvements

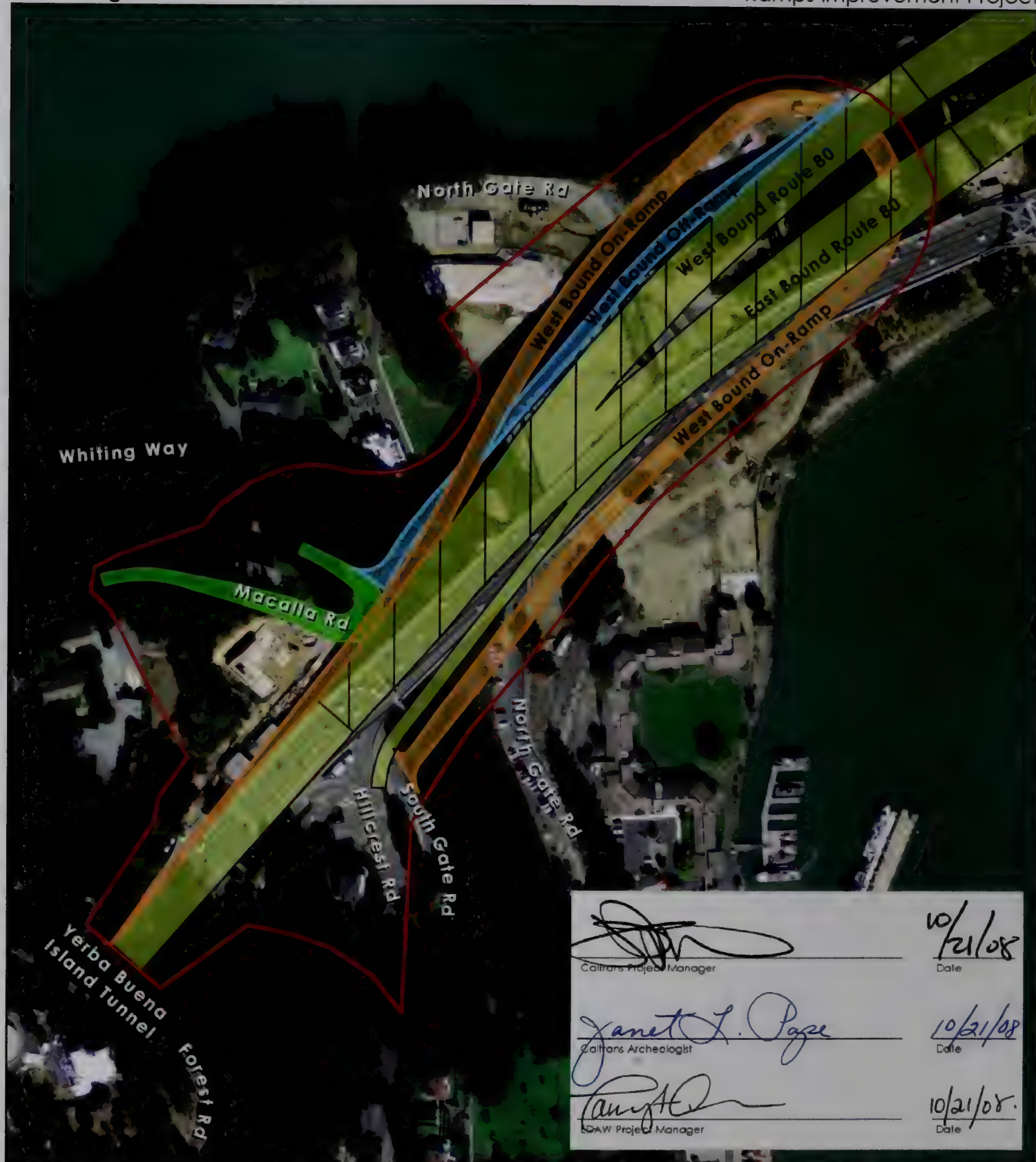
- Area of Potential Effect
- Separate Project Currently Under Construction**
- San Francisco-Oakland Bay Bridge East Span Seismic Safety Project
  - Transition Structure Portion of SFOBB





**Map 3b: Alternative 4**  
**Archeological Area of Potential Effect**

Yerba Buena Island  
Ramps Improvement Project



**Alternative 4 Proposed Ramps**

- Proposed West Bound Off-Ramp
- Proposed West Bound On-Ramp
- Proposed Macalla Road Improvements

Area of Potential Effect

**Separate Project Currently Under Construction**

- San Francisco-Oakland Bay Bridge
- East Span Seismic Safety Project
- Transition Structure Portion of SFOBB

Image: NIMA/ USGS 2004  
Data: DMJM Homs, EDA  
9/09


0 100 200 300 Feet






**Map 4a: Alternative 2b**  
**Historic Architectural Focused Area of Potential Effect**

Yerba Buena Island  
 Ramps Improvement Project





	10/24/08
Caltrans Project Manager	Date
	10/23/08
Caltrans Architect for Historic	Date
	10/23/08
EBAW Project Manager	Date

**Alternative 2b Proposed Ramps**

-  Proposed West Bound Off-Ramp
-  Proposed West Bound On-Ramp
-  Proposed Macalla Road Improvements

 Area of Potential Effect

**Separate Project Currently Under Construction**

-  San Francisco-Oakland Bay Bridge East Span Seismic Safety Project
-  Transition Structure Portion of SFOBB

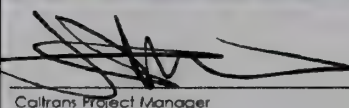


0 100 200 300 feet






**Map 4b: Alternative 4**  
**Historic Architectural Focused Area of Potential Effect**

Yerba Buena Island  
Ramps Improvement Project



	10/24/08
Caltrans Project Manager	Date
	10/23/08
Caltrans Architectural Historian	Date
	10/23/08
EBAW Project Manager	Date

- Alternative 4 Proposed Ramps**
-  Proposed West Bound Off-Ramp
  -  Proposed West Bound On-Ramp
  -  Proposed Macalla Road Improvements




-  Area of Potential Effect
- Separate Project Currently Under Construction**
  -  San Francisco-Oakland Bay Bridge East Span Seismic Safety Project
  -  Transition Structure Portion of SFOBB

Image: Nima/ JSGS 2004  
 Data: DMJM Hams, EDA  
 6/07

0 100 200 300 Feet

North

## **ATTACHMENT B**

---

Bridge Sheet







# Structure Maintenance & Investigations

SM&I



April 2008

## Historical Significance - State Agency Bridges

### District 04

#### Alameda County

Bridge Number	Bridge Name	Location	Historical Significance	Year Built	Year Wid/Ext
33 0002	EDENVALE UNDERPASS	04-ALA-238-2.19-FMT	4. Historical Significance not determined	1921	1937
33 0003	ALAMEDA CREEK	04-ALA-238-3.46-FMT	5. Bridge not eligible for NRHP	1937	2006
33 0005	DRY CREEK	04-ALA-238-7.19-UNC	5. Bridge not eligible for NRHP	1929	1969
33 0006	SAN LORENZO CREEK	04-ALA-238-13.21-HAY	5. Bridge not eligible for NRHP	1909	1957
33 0007	SAN LEANDRO CREEK	04-ALA-580-R34.55-SLN	5. Bridge not eligible for NRHP	1964	
33 0009Z	LANDVALE SIDEHILL VIADUCT	04-ALA-013-R9.55-OAK	5. Bridge not eligible for NRHP	1934	1970
33 0012	ARROYO POSITAS	04-ALA-580-13.82	5. Bridge not eligible for NRHP	1972	
33 0013	COTTONWOOD CREEK	04-ALA-580-15.63	5. Bridge not eligible for NRHP	1972	
33 0014	RANCHO DRAIN	04-ALA-580-17.57-PLE	5. Bridge not eligible for NRHP	1970	
33 0015L	TASSAJARA CREEK	04-ALA-580-18.32-PLE	5. Bridge not eligible for NRHP	1965	1995
33 0015R	TASSAJARA CREEK	04-ALA-580-18.32-PLE	5. Bridge not eligible for NRHP	1965	
33 0015Y	TASSAJARA CREEK	04-ALA-580-18.32-PLE	5. Bridge not eligible for NRHP	1965	
33 0016G	W580-N&S680 CONNECTOR	04-ALA-580-20.56-PLE	5. Bridge not eligible for NRHP	1965	1989
33 0016L	ALAMO CANAL	04-ALA-580-20.56-PLE	5. Bridge not eligible for NRHP	1952	1996
33 0016R	ALAMO CANAL	04-ALA-580-20.56-PLE	5. Bridge not eligible for NRHP	1952	1965
33 0020	POWELL STREET UC	04-ALA-080-3.79-EMV	5. Bridge not eligible for NRHP	1954	1968
33 0023	UNIVERSITY AVENUE OC	04-ALA-080-5.82-BER	5. Bridge not eligible for NRHP	1939	1956
33 0025	SFOBB EAST BAY	04-ALA-080-1.15-OAK	1. Bridge is on NRHP	1936	1962
33 0026L	GREENVILLE ROAD UC	04-ALA-580-R8.29	5. Bridge not eligible for NRHP	1969	
33 0026R	GREENVILLE ROAD UC	04-ALA-580-R8.29	5. Bridge not eligible for NRHP	1969	
33 0027	FIFTH AVENUE OVERHEAD	04-ALA-880-30.38-OAK	5. Bridge not eligible for NRHP	1948	1963
33 0028M	FIBREBOARD UC	04-ALA-080-3.96-EMV	5. Bridge not eligible for NRHP	1954	1968
33 0030	EAST NILES UNDERPASS	04-ALA-084-10.71-FMT	4. Historical Significance not determined	1937	
33 0034	ROSEWARNES UNDERPASS	04-ALA-084-12.1-FMT	5. Bridge not eligible for NRHP	1906	
33 0035	FARWELL UNDERPASS	04-ALA-084-13.03	5. Bridge not eligible for NRHP	1932	
33 0036	ALAMEDA CREEK	04-ALA-084-13.33	5. Bridge not eligible for NRHP	1928	
33 0039	ALAMEDA CREEK BOH	04-ALA-084-14.32	3. Bridge is possibly eligible for NRHP	1947	
33 0040L	HIGH STREET SEPARATION & OH	04-ALA-880-27.63-OAK	5. Bridge not eligible for NRHP	1950	1963
33 0040R	HIGH STREET SEPARATION & OH	04-ALA-880-27.63-OAK	5. Bridge not eligible for NRHP	1950	1963
33 0041	FRUITVALE AVENUE OH	04-ALA-880-28.24-OAK	5. Bridge not eligible for NRHP	1948	1963
33 0042	SILVER SPRINGS UP AND OFF RAMP SEPARATION	04-ALA-084-16.93	4. Historical Significance not determined	1941	
33 0043	ARROYO DE LA LAGUNA	04-ALA-084-17.22	5. Bridge not eligible for NRHP	1939	
33 0046Y	ARROYO DE LA LAGUNA	04-ALA--	5. Bridge not eligible for NRHP	1941	1983
33 0047	ALAMEDA CREEK	04-ALA-680-R10.15	5. Bridge not eligible for NRHP	1927	1990
33 0051L	EL CERRITO SEPARATION & OH	04-ALA-080-7.2-ALB	5. Bridge not eligible for NRHP	1960	1998
33 0051R	80/580 EL CERRITO SEPARATION OH	04-ALA-080-7.2-ALB	5. Bridge not eligible for NRHP	1999	
33 0053	NILES JUNCTION UNDERPASS	04-ALA-084-10.63-FMT	4. Historical Significance not determined	1937	
33 0060	FOLGER AVENUE UNDERPASS	04-ALA-013-13.69-BER	4. Historical Significance not determined	1936	
33 0061L	DISTRIBUTION STRUCTURE	04-ALA-580-46.09-OAK	5. Bridge not eligible for NRHP	1955	1962
33 0061R	DISTRIBUTION STRUCTURE	04-ALA-580-46.09-OAK	5. Bridge not eligible for NRHP	1935	2006
33 0066	ARROYO SECO	04-ALA-580-11.04-LVMR	5. Bridge not eligible for NRHP	1954	1972
33 0082	MULFORD OVERHEAD	04-ALA-112-R.06-SLN	5. Bridge not eligible for NRHP	1982	
33 0085	ARROYO LAS POSITAS	04-ALA-580-11.72	5. Bridge not eligible for NRHP	1972	



## **ATTACHMENT C**

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### Historical Resources Evaluation Report





# HISTORICAL RESOURCES EVALUATION REPORT

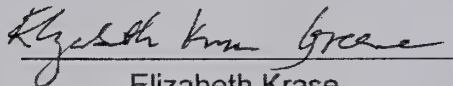
## Yerba Buena Island Ramps Improvement Project

San Francisco, California

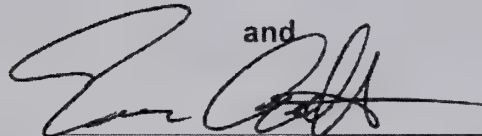
04-SF-80, PM 7.6-8.1/12.3-13.2

EA 04-3A64OK

### Prepared For:



Elizabeth Krase,  
Branch Chief, South Counties  
Office of Cultural Resource Studies  
Caltrans District 4  
111 Grand Avenue  
Oakland, California 94623



Eric Cordoba, Project Manager  
SFCTA  
100 Van Ness Avenue, 26th Floor  
San Francisco, CA 94102

### Prepared By:



Toni Webb, Architectural Historian  
JRP Historical Consulting, LLC  
1490 Drew Avenue, Suite 110  
Davis, CA 95618

May 2009





## SUMMARY OF FINDINGS

San Francisco County Transportation Authority (SCFTA) proposes the replacement of westbound on- and off-ramps on the east side of Yerba Buena Island. The proposed project would improve the seismic, traffic safety requirements, and design standards of the current ramps. SFCTA is the Lead Agency under CEQA while Caltrans is the lead agency under NEPA. JRP Historical Consulting, LLC (JRP) prepared this Historical Resources Evaluation Report (HRER) as part of the environmental compliance for the Project. The purpose of this document is to comply with applicable sections of the National Historic Preservation Act (NHPA) and the implementing regulations of the Advisory Council on Historic Preservation (ACHP) as these pertain to federally funded undertakings and their impacts on historic properties. The properties have also been evaluated in accordance with Section 15064.5(a)(2)-(3) of the California Environmental Quality Act (CEQA) Guidelines using the criteria outlined in Section 5024.1 of the California Public Resources Code.

There are four historic properties within the Focused Area of Potential Effects (APE) for the built environment: Senior Officers' Quarters Historic District; Quarters 10 (which includes Building 267); Quarters 8; and a portion of the East Span of the San Francisco-Oakland Bay Bridge (SFOBB). All four historic properties were previously evaluated and were not evaluated as part of this report. The Senior Officers' Quarters district, Quarters 10, and the SFOBB are listed in the National Register of Historic Places (NRHP) and the California Register of Historical Resources (CRHR). Quarters 8 has been determined eligible for listing in the NRHP and CRHR. All of these historic properties are also considered historical resources for the purposes of CEQA. Although a portion of the East Span of the SFOBB is located within the Focused APE, this historic property was documented as part of the SFOBB East Span Seismic Safety (Earthquake Retrofit) Project, which was completed in 2001. Because the current project proposes the construction of new ramps that will connect to the new East Bay Span currently under construction, the proposed project has no potential to affect the existing SFOBB historic property. Therefore, no further study of the SFOBB as a historic resource is required for this project.

This HRER provides updates of the previous inventory and evaluations for the three historic properties identified above: Senior Officers' Quarters Historic District, Quarters 10, and Quarters 8. This report concludes that the Senior Officers' Quarters Historic District, Quarters 10 (and Building 267), and Quarters 8 have remained relatively unchanged since they were listed or determined eligible for listing in the NRH and changes to their listing or eligibility are not warranted. All of these properties remain historical resources for the purposes of CEQA.

## TABLE OF CONTENTS

SUMMARY OF FINDINGS .....	i
1. PROJECT DESCRIPTION.....	1
2. RESEARCH AND FIELD METHODS .....	4
3. HISTORICAL OVERVIEW .....	6
4. DESCRIPTION OF RESOURCES .....	10
5. FINDINGS AND CONCLUSIONS .....	12
6. REFERENCES .....	15
7. PREPARERS' QUALIFICATIONS .....	16

## ATTACHMENTS

Appendix A	Maps
Appendix B	DPR 523 Forms
Appendix C	Letters to Interested Parties
Appendix D	Previous Historic Documentation

## 1. PROJECT DESCRIPTION

Yerba Buena Island (YBI) is located in the San Francisco Bay approximately halfway between Oakland and San Francisco.<sup>1</sup> YBI is only accessible to vehicular traffic via the San Francisco Oakland Bay Bridge (SFOBB) stretch of I-80. The SFOBB is considered a “lifeline structure” and is a critical link between the East Bay and San Francisco. It provides the only vehicle access to YBI, the active U.S. Coast Guard (USCG) facilities located on the south side of the island, and Treasure Island, located immediately north of YBI.

The proposed project would replace the existing westbound on- and off-ramps located on the east side of YBI with new westbound on- and off-ramps. The new ramps would maintain the functional role of the current ramps while satisfying seismic requirements, highway design standards, traffic operations, and improve safety. The YBI Ramps Improvement Project is independent of both the SFOBB East Span Seismic Safety Project, currently under construction, and the Treasure Island and Yerba Buena Island (TI/YBI) Redevelopment Plan, currently undergoing its own environmental review process.

The purpose of the project is to improve the safety of the westbound on- and off-ramps to the extent physically and economically feasible. The current ramps do not meet current Caltrans design standards. The proposed project would provide standard deceleration length for the off-ramp and improved acceleration/merging length for the on-ramp. In addition, the project would improve traffic operations to and from YBI.

Alternatives have been proposed to address the geometric deficiencies of the existing on- and off-ramps. In addition to the no-build alternative, the proposed build alternatives would analyze the effects to the SFOBB (I-80) mainline structure and YBI. The proposed project is located between post-mile (PM) 7.6 and 8.1<sup>2</sup> beginning at the east portal of the YBI tunnel and ending at the east side of the Transition Structure portion of the new SFOBB. The SFOBB Transition Structure is located between PM 7.9 and 8.1 between the YBI tunnel and the SFOBB Self-Anchored Suspension (SAS) span.<sup>3</sup>

### No Build Alternative

This Alternative assumes that the existing on- and off-ramps would remain in place and no further action or improvements would occur.

### Alternative 2b

Alternative 2b would include removal of the existing westbound on- and off-ramps on the east side of YBI, construction of a westbound loop on-ramp from Macalla Road on the east side of YBI, and construction of a westbound off-ramp to Macalla Road on the east side of YBI.

---

<sup>1</sup> The project description was prepared by EDAW/AECOM.

<sup>2</sup> Kilometer Post (KP) 12.3 and 13.2.

<sup>3</sup> The SFOBB Transition Structure is the name of a section of the new Bay Bridge. The Transition Structure will connect the Self-Anchored Suspension (SAS) span to Yerba Buena Island, and will transition the East Span's side-by-side road decks to the upper and lower decks of the YBI tunnel and West Span.



This alternative proposes to reconstruct two of the existing six on- and off-ramps at the I-80/YBI interchange. The proposed on- and off-ramps would provide standard shoulder widths, and would include the following features:

- Westbound on-ramp on the east side of YBI- This ramp would begin at a “T” intersection at Macalla Road, loop right with a tight radius, and merge on to the north side of the Bay Bridge. The length of this ramp would be approximately 876 feet (267 meters). This ramp would have two traffic lanes, merging into one as it connects to the SFOBB. One lane would be a high occupancy vehicle (HOV) lane and the other a mixed-flow<sup>4</sup> lane.
- Westbound off-ramp on the east side of YBI - This ramp would diverge from the new SFOBB Transition Structure between bents W3 and W4 curving around the Nimitz House and terminate at a “T” intersection at Macalla Road. The length of this ramp would be approximately 1,115 feet (340 meters). A stop sign is proposed at the ramp terminus.
- Macalla Road would be widened for approximately 660 feet adjacent to the terminus of the westbound on- and off-ramps. The existing roadway is about 20 feet wide near the ramp terminus. The roadway widening is required to accommodate a 12-foot wide multi-use pedestrian/bike path and two 12-foot wide lanes within the Caltrans right-of-way. A retaining wall would be constructed adjacent to Macalla Road to provide the required width. The height of the retaining wall would vary from 4 to 16 feet and would retain the hillside above Macalla Road. The stairway adjacent to the Caltrans Substation would be relocated to the west side of the building to make room for the new retaining wall. The roadway width would vary around the curve at Southgate Road to provide proper width for truck turning movements.
- Under Alternative 2B, the westbound on- and off-ramps would terminate at Macalla Road where Quarters 10 and Building 267 are currently located.<sup>5</sup> Quarters 10 and Building 267 would be relocated prior to construction of the ramps at Macalla Road. The relocation site for these buildings would be on YBI and would be determined under the Section 106 mitigation development process.

#### Alternative 4

Alternative 4 would include the removal of the existing westbound on- and off-ramps on the east side of YBI, construction of westbound on-ramp from Southgate Road, and construction of westbound off-ramp to Macalla Road on the east side of YBI.

This alternative proposes to reconstruct two of the existing six on- and off-ramps at the I-80/YBI interchange. The proposed on- and off-ramps would provide standard shoulder widths, and would include the following features:

- Westbound on-ramp on the east side of YBI - This ramp would begin at Southgate Road, proceed east paralleling the eastbound on-ramp, loop under the new SFOBB Transition Structure near its eastern end to provide adequate merging distances, cross over the

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<sup>4</sup> A mixed-flow lane is a general purpose travel lane with no traffic restrictions.

<sup>5</sup> Quarters 10 and Building 267 (a contributing garage) are listed in the National Register of Historic Places and significant at the local level under Criterion C, as a significant example of mid-twentieth century residential architecture.

westbound off-ramp along the north side of the Bay Bridge. The length of this ramp would be approximately 2,883 feet (879 meters). An HOV lane would not be provided under Alternative 4.

- Westbound off-ramp on the east side of YBI - This ramp would diverge from the new SFOBB Transition Structure between bents W2 and W3, parallel the Transition Structure, cross under the westbound on-ramp and terminate at a "T" intersection at Macalla Road. The length of this ramp would be approximately 1,168 feet (356 meters). A stop sign is proposed at the ramp terminus.
- Macalla Road would be widened for approximately 660 feet adjacent to the terminus of the westbound on-and off-ramps. The existing roadway is about 20 feet wide near the ramp terminus. The roadway widening is required to accommodate a 12-foot wide multi-use pedestrian/bike path and two 12-foot wide lanes within the Caltrans right-of-way. A retaining wall would be constructed adjacent to Macalla Road to provide the required width. The height of the retaining wall would vary from 4 to 16 feet and would retain the hillside above Macalla Road. The roadway width would vary around the curve at Southgate Road to provide proper width for truck turning movements.
- Under Alternative 4, Quarters 10 and Building 267 and its associated landscaping would remain in place.



## 2. RESEARCH AND FIELD METHODS

JRP Historical Consulting, LLC (JRP), in consultation with the California Department of Transportation (Caltrans), developed the architectural Area of Potential Effects (APE) for this project in October 2008. Caltrans signed the APE on October 23 and 24, 2008. Since that time, initial project design studies identified the need for improvements to Macalla Road. The architectural APE was revised after consultation with Caltrans and is provided in Map 3, Appendix A. Consistent with Caltrans policies and general cultural resource practices, the area for potential effect for the built environment encompassed areas that might be either directly or indirectly affected by construction; i.e., those areas within which the project could cause a change in character or use of historic properties. Only those resources located within the architectural APE were included in the survey.

The APE for historic architectural resources includes two areas: a General APE and Focused APE. The General APE was developed to encompass both the project area, and the contributing elements of the large, multi-component SFOBB historic property that extend outside of the project area. The Focused APE encompasses only the project area; therefore, those portions of the SFOBB property that may be potentially affected by the Project are included. A small segment of the westernmost portion of the East Span is extant within the Focused APE. Besides the SFOBB, there are three other resources within the Focused APE: the Senior Officers' Quarters Historic District, Quarters 10 (which includes Building 267), and Quarters 8.

All of the historic resources within Focused APE have been subject to one or more inventory and evaluation efforts over the last thirty years. JRP inventoried and evaluated the Senior Officers' Historic District, Quarters 10, and Quarters 8 for the Navy in 1997 as part of the Navy's Base Realignment and Closure program. The following year, Caltrans evaluated Quarters 10 (and Building 267) for the SFOBB East Span Seismic Safety Project. Then in 2003, JRP prepared National Register nominations and Historic American Building Survey reports for the both the Senior Officers' Historic District and Quarters 10.<sup>6</sup>

The earliest evaluation of the San Francisco-Oakland Bay Bridge was completed in 1977 and resulted in SHPO's determination of eligibility for listing in the National Register.<sup>7</sup> The bridge was evaluated again in 1983 as part of the *I-280 Transfer Concept Program* which was followed in 1999 by a 273-page Historic American Engineering Record (HAER) report. That HAER document presents a comprehensive history of the bridge's construction, use, significance, and a detailed description of the structure, and includes over 400 contemporary and historic photographs, as well as photographic reproduction of historic plans and drawings. The HAER became the basis for the 2001 National Register nomination prepared by John J. Mascitelli, which resulted in the bridges' listing in the National Register in August 2001.<sup>8</sup> In addition to survey and evaluation efforts, Caltrans studied the potential effects to the bridge from the

<sup>6</sup> JRP Historical Consulting Services, "Cultural Resources Inventory and Evaluation Investigations: Yerba Buena Island and Treasure Island Naval Station Treasure Island, San Francisco, California," prepared for Engineering Field Activity, West, Naval Facilities Engineering Command, (March 1997); HABS No. CA-1793-A through M.

<sup>7</sup> California Historic Information System (CHRIS), August 8, 2005.

<sup>8</sup> Caltrans District 4, "Findings of Adverse Effect: Buildings and Structures, San Francisco-Oakland Bay Bridge East Span Seismic Safety Project, EA 012000," (September 1998) 3; Caltrans, "Historic Property Survey Report for the Proposed Seismic Retrofit of the San Francisco-Oakland Bay Bridge (EA 012000)" Revision 0, (1995).



proposed *San Francisco-Oakland Bay Bridge East Span Seismic Safety Project* in 1998. This project included three alternatives for a new replacement structure and including proposed temporary detour structures on the east side of Yerba Buena Island.<sup>9</sup> The adverse effects were addressed by mitigation set forth in a memorandum of agreement dated May 26, 2000.

Because more than five years has passed since these resources were listed or determined eligible for the National Register, JRP updated the previous inventory and evaluations of three of the historic properties (Quarters 8, Quarters 10, and the Senior Officers' Quarters Historic District) to account for any changes or alterations to the historic properties. JRP conducted fieldwork in November 2008 to identify any alteration to historic properties. JRP prepared DPR 523 form updates to present: a summary of previous evaluation efforts and confirmation of the current historic status and character-defining features. Digitized copies of the previous historic documentation are found in Appendix D. Because the current project proposes the construction of new ramps that will connect to the new East Bay Span currently under construction, the proposed project has no potential to affect any components of the existing SFOBB historic property. Because an update for the SFOBB is not warranted, no further study of the SFOBB as a historic resource is required for this project. Please refer to Section 4 for a description of the cultural resources addressed in this HRER.

Letters informing interested parties of this project were sent to area planning agencies, local governments, historical societies, and museums on December 11, 2008. No responses have been received to date. Copies of the transmittal letters are included in Appendix C. Maps depicting the project's location and vicinity (Map 1), General APE (Map 2), as well as project's Focused APE (Maps 3), are found in Appendix A.

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<sup>9</sup> Caltrans District 4, "Findings of Adverse Effect: Buildings and Structures"; HAER No. CA-32

### 3. HISTORICAL OVERVIEW

For much of its history, Yerba Buena Island has been dominated by a military presence, first by the Army and United States Life-Saving Service (predecessor of the Coast Guard) in the nineteenth century and then by the Navy and Coast Guard during the twentieth century. The Naval Training Station at Yerba Buena Island was established in 1898 to fulfill the Navy's need for a western training station. The station became one of only four such Navy training facilities in the country. Although the small island was ill-suited for such a use, the station was a key facility during the first quarter of the twentieth century, before Navy operations were moved to San Diego.<sup>10</sup>

The station's main purpose during that time was to train new Navy recruits to serve in the rapidly modernizing US Navy. Recruits spent up to one year at the station before they were transferred to the fleet so at any given time, the station was occupied by four to five hundred trainees. With this many recruits, the Naval Station used almost all of Yerba Buena Island to some extent; however, the functional core of the Training Station was bounded by East Point (a hill at the eastern end of the island, now hidden beneath the Bay Bridge) on the east; East Cove on the south (East Cove is now used by the Coast Guard); San Francisco Bay on the north (now the harbor between Yerba Buena and Treasure Islands); and on the west by the central hillside of Yerba Buena (denoted today by the east portal to the Yerba Buena Tunnel for the Bay Bridge).



Figure 1. View of Naval Training Station, 1901, with Officers' Quarters labeled in left background. [Treasure Island Museum Collection, unnumbered, Treasure Island, San Francisco, CA]

Twenty-three buildings were constructed on Yerba Buena Island during the initial period of construction between 1900 and 1905, included the Quarters 1 through 7, which today are seven of the ten buildings within the Senior Officers' Quarters Historic District (Map Reference No. 3),

<sup>10</sup> JRP Historical Consulting Services, "History and Historic Resources of the Military in California, 1796 to 1989," Volume II of *California Historic Military Buildings and Structures Inventory* Prepared for the US Army Corps of Engineers, Sacramento District, March 2000, 5-7; E. Hice and D. Schierling "Historical Study of Yerba Buena Island, Treasure Island, and their Buildings," Mare Island Naval Shipyard, Base Realignment and Closure, Revision 1, prepared for Environmental Department, Naval Station, March 1996, 1-14.



as well as Quarters 8 (Map Reference No. 1), a residence the Navy constructed for the commander of the Marine Corps. The majority of these buildings were designed by the Navy's Bureau of Yards and Docks (BuDocks), with the exception the Marine Corps buildings (Quarters 8 and Marine barracks), which were designed by the local architectural firm of the Reid Brothers.<sup>11</sup>

Overcrowding on the island was a persistent problem for the Navy and only worsened during the preparedness build-up for the United States' entry into World War I, when up to 13,000 men were assigned there at one time. Consequently the Navy looked elsewhere to locate its major west coast training station and in 1917 a second west coast training station was established in San Diego. After the war, the Navy elected to expand the San Diego facility and closed the training station at Yerba Buena Island. The last of the training station personnel were relocated to San Diego in 1923 and the Yerba Buena facility was decommissioned, although island remained a Navy "Receiving Ship" facility, a transient station for sailors awaiting assignment for duty on ships at sea from 1923 to 1946. It appears that relatively few men were stationed at the facility in association with this function.<sup>12</sup>



Figure 2. Yerba Buena Island during construction of the Oakland Bay Bridge. The Training Barracks and Officers' Housing are shown center right. [Treasure Island Museum Collection, Yerba Buena Island folder, Treasure Island, San Francisco, CA]

<sup>11</sup> E. Hice and D. Schierling, "Historical Study of Yerba Buena Island, Treasure Island," 1-48; JRP, "Cultural Resources Inventory and Evaluation Investigations: Yerba Buena Island and Treasure Island Naval Station," 1-5; JRP Historical Consulting Services, DPR 523 Form for Quarters 8, January 1997.

<sup>12</sup> E. Hice and D. Schierling, "Historical Study of Yerba Buena Island, Treasure Island," 1-39.



During the 1930s three coinciding events of substantial importance forever changed the topography and history of Yerba Buena Island. The first was the construction of the 8-mile long SFOBB, which linked the East Bay to San Francisco. Completed in 1936, the construction of anchorages, piers, abutments and the boring of the largest diameter tunnel in the world through the island, caused massive disruption to the topography of the island. Nevertheless, the bridge was hailed as an engineering feat that dramatically changed transportation in the Bay Area.<sup>13</sup> The second event was the Golden Gate International Exposition (GGIE), held in 1939 and 1940 to celebrate the completion of the SFOBB and Golden Gate Bridge. The City of San Francisco hosted the GGIE on a new island - Treasure Island - built on the Yerba Buena Shoals by the Corps of Engineers between 1935 and 1937. The island was to serve two purposes: as a site for the exposition and later, as the site for the future airport for San Francisco; however, the reopening of the GGIE in 1940 coincided with the turbulence in Europe, as German forces were closing in on Paris.



Figure 3. Early postcard view (ca. 1936) of the completed SFOBB. [JRP Historical Consulting, LLC]

With tension growing between United States and Japan, the Navy jumped at the opportunity to utilize the 400-acre island adjacent to their already established facility at Yerba Buena Island for a new Navy station. Plans for the local airport at Treasure Island were postponed and by early 1941 the Navy was temporarily making use of Treasure Island for its war planning. In lieu of Treasure Island, the Navy traded lands it owned on the San Francisco Peninsula, which would eventually be developed for the modern San Francisco International Airport.

While Yerba Buena Island continued its function as a receiving ship facility during World War II, the major build-up was at Treasure Island, where the new Naval Training and Distribution Center (TADCEN) Treasure Island began permanently occupying the former exposition site by 1943. After the attack on Pearl Harbor on December 7, 1941, the Treasure Island's main mission was to supply armed uniformed guards for merchant marine vessels sailing in the Pacific Ocean.

<sup>13</sup> For a comprehensive history of the planning and construction of the SFOBB, see HAER No. CA-32.

Although the Navy assigned training units to Treasure Island, during World War II it was the temporary homeport for thousands of sailors awaiting assignment to vessels headed into battles in the Pacific.<sup>14</sup>

Despite the build-up at Treasure Island, Yerba Buena Island was functionally distinct and it retained many of the basic buildings needed to handle the men in its receiving ship capacity. However, space limitations on the island during and after the war forced the Navy to officially designate Yerba Buena Island as Receiving Station, Treasure Island in 1947.<sup>15</sup> The Navy continued to use Yerba Buena Island, although it primarily served a residential purpose in the support of the training center at Treasure Island. During this period, the Officers' Quarters (Quarters 1-8) still served as housing for the upper level officers; however the base Commander's residence was moved from Quarters 1 to Building 62 in 1947. One additional officer's residence, Quarters 10, was constructed on the island in 1948. Many older buildings were demolished or altered for residential use and newer residences were constructed on the west side of the island in an area used little by the Navy before 1945. All enlisted personnel were transferred to housing on Treasure Island by 1966.

Over the next thirty years, the naval presence on Yerba Buena Island diminished as personnel was reassigned from the island and the Navy transferred more and more land to the US Coast Guard. The beginning of the end of the Navy's occupation of the island came in 1993, when the Defense Base Realignment and Closure Commission (BRAC) recommended the closure of NAVSTA Treasure Island. The Navy ceased naval activity at Yerba Buena in 1997 and today maintains much of both Treasure and Yerba Buena islands under caretaker status until the transfer of land to the City of San Francisco is complete.<sup>16</sup>

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<sup>14</sup> E. Hice and D. Schierling "Historical Study of Yerba Buena Island, Treasure Island," 2-26 to 2-28. The use of the island during World War II is detailed in LCRD E. A. McDevitt, USNR, *The Naval History of Treasure Island*, (Treasure Island: US Naval Training and Distribution Center, 1946).

<sup>15</sup> E. Hice and D. Schierling, "Historical Study of Yerba Buena Island, Treasure Island," 1-41.

<sup>16</sup> The Navy transferred Quarters 8 (parcel YB018) to the City of San Francisco prior to August 2005. SulTech and Tetra Tech EM Inc. "Final Finding of Suitability to Transfer for Property on Yerba Buena Island, Naval Station Treasure Island, San Francisco, California," March 22, 2006.



#### 4. DESCRIPTION OF RESOURCES

The Focused APE for the built environment includes four historic properties: a portion of the SFOBB, Senior Officers' Quarters Historic District, Quarters 8, and Quarters 10 (which includes Building 267). All of the properties are located in close proximity to one another, on the east side of Yerba Buena Island. Quarters 8 is sited south of the SFOBB, while the historic district and Quarters 10 are immediate north of the bridge. The Navy constructed all of the buildings between 1900 and 1948 as part of its Yerba Buena Island installation. The completion of the SFOBB in 1936 bisected Quarters 8 from the other seven officer quarters' and today the bridge provides an accepted directional division between the north and south side of the island.

##### Quarters 8

##### Map Reference 1

Quarters 8 is a symmetrical three-story, wood-frame, Mediterranean style residence constructed in 1905. The building has a square footprint and has a recessed third story partially concealed by a second-story parapet. The building is primarily clad in stucco siding but has horizontal wood siding on the third floor. The north and south side include two exterior brick chimneys and double-hung wood windows. The building is significant under Criterion A within the context of military history, and under Criterion C, as an unusual example of Mediterranean-style architecture and as the work of the master architectural firm of the Reid Brothers.

##### Quarters 10 (and Building 267)

##### Map Reference 2

Quarters 10 was constructed in 1948 and is a mixture of three modern architectural styles: Moderne, International, and Bay Region. The two-story building is set on a hillside and has a rectangular footprint with a curved end wall and flat roof with projecting eaves with exposed rafter tails and wide frieze. The building has board formed-concrete walls, some clad with beveled wood siding and a mixture of wood fixed and casement windows. Adjacent to Quarters 10, Building 267 is similar in design and construction, with board-formed concrete and beveled wood siding, and a flat roof with projecting eave and exposed rafter tails. The property is significant at the local level under Criterion C, as significant example of mid twentieth century residential architecture.

##### Senior Officers' Quarters Historic District (and Quarters 1)

##### Map Reference 3

The Senior Officers' Quarters Historic District includes eleven contributing elements: seven residences (Quarters 1 through 7), two apartments/garages (Buildings 83 and 230), a five-car garage (Building 205), and the landscape that surrounds the district. The district is generally bounded by Northgate Road on the west and north, the greensward on the east, the SFOBB and hillside on the south, and the southern edge of the informal landscaping south of Building 230 and directly west of Quarters 1. The majority of these wood-frame buildings were constructed around the turn of the twentieth century, with the exception of Buildings 83, 230 and 205, which were built in 1918, 1936, and 1944, respectively. The three-story Classical Revival-style officers' quarters (Quarters 1-7) were built between 1901-1903 and have square or rectangular footprints, concrete or brick foundations, clapboard or weatherboard wood siding, hip roofs with dormers and double-hung wood windows. Buildings 83 and 230 are two-story, wood-frame buildings with concrete foundations, gable roofs and double-hung wood windows. Both Buildings 83 and 230 consists of garages on the first floor and a second-story residence. Building 83 has weatherboard wood siding, open eaves and triangular knee braces, while Building 230 has drop wood siding and roof dormers. Building 205, a five-bay garage, is the



only one-story building within the district. It has a rectangular footprint, sits on concrete foundation with lap wood siding and gable roof. All of the buildings are surrounded by different landscape features: greensward on the west of Quarters 1-5, formal terraced garden west of Quarters 1, and terraced central garden west of Quarters 2-5 and north of Buildings 83 and 205. The property is significant at the local level under Criterion A, for its association with the early development of military facilities on the West Coast, and under Criterion C, as significant examples of Classical Revival/Colonial Revival residential architecture.

#### San Francisco-Oakland Bay Bridge

Map Reference 4

The SFOBB is significant at the national level under Criterion A, for its important influence on transportation in San Francisco Bay Area and the state as a whole. The bridge is also significant for its engineering design (Criterion C). The SFOBB consists of fifteen contributing elements. The six contributing buildings include the Transbay Transit Terminal Building (San Francisco), Key System Electrical Substation (San Francisco), Key System Electrical Substation (Yerba Buena Island), SFOBB Firehouse (also known as the Caltrans Garage, Yerba Buena Island), Bay Bridge Substation (also known as the Caltrans substation, Oakland), and the Key Pier Substation (Oakland). The Firehouse and Key System Electrical Substation, which were once located within the Focused APE, have been demolished. The nine contributing structures consist of individual components of the bridge itself and include approaches, San Francisco approach on- and off-ramps, street overcrossings (bus ramps in San Francisco), the main bridge spans (West and East Bay spans) and the Yerba Buena Tunnel.<sup>17</sup> Of these structures, only a short, westernmost section of the East Bay Span (Bridge No. 33-025) is located within the Focused APE. A new East Span of the SFOBB has been under construction since 2002 and construction activity continues within the Focused APE.

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<sup>17</sup> The nine contributing structures have individually been assigned Caltrans Bridge numbers: Bridge Nos. 34-118R, 34-118L, 34-117S, 34-116F, 34-003, 34-004, 33-025, 34-119Y, 34-120Y.

## 5. FINDINGS AND CONCLUSIONS

JRP prepared this HRER as part of the Yerba Buena Island Ramps Improvement Project and to comply with applicable sections of National Historic Preservation Act (NHPA) and the implementing regulations of the Advisory Council on Historic Preservation (ACHP) as these pertain to federally funded undertakings and their impacts on historic properties. The built environment resources have also been evaluated in accordance with Section 15064.5(a)(2)-(3) of the CEQA Guidelines using the criteria outlined in Section 5024.1 of the California Public Resources Code. All four of the historic properties located within Focused APE were previously evaluated: Senior Officers' Quarters Historic District, Quarters 10 (which includes Building 267), Quarters 8, and a portion of the East Span of the San Francisco-Oakland Bay Bridge (SFOBB). Mary K. Smith, who meets the Professionally Qualified Staff Standards in Section 106 PA Attachment 1 as an Architectural Historian or above, has determined that the only other properties present within the APE, including state-owned resources, meet the criteria for Section 106 PA Attachment 4 (Properties Exempt from Evaluation).

Quarters 8 (Map Reference No. 1) has been determined eligible for the National Register at the local level of significance. The building is significant under Criterion A within the context of military history, and under Criterion C, as an unusual example of Mediterranean-style architecture and as the work of the master architectural firm of the Reid Brothers. The period of significance extends from 1905 to 1947. Character-defining features of Quarters 8 include its massing, recessed third floor, symmetrical façade, smooth stucco and wood siding, parapets, full-width front porch with square columns and solid railing, second-floor balcony, hip roof with box cornice and block modillions, and original fifteen-over-one, twelve-over-one, and eight-over-one double hung wood windows, exterior brick chimneys, and triangular-shaped property.

Quarters 10 (Map Reference No. 2) and Building 267, a contributing garage, are listed in the National Register. The property is significant at the local level under Criterion C, as significant example of mid twentieth century residential architecture. The property boundary includes Quarters 10, Building 267, the landscape immediately adjacent to these buildings including lawn and garden, driveway and the northern retaining wall. The period of significance for this property is 1948, the year of its construction. Character-defining features of Quarters 10 include its setting and landscape, and those distinctive architectural characteristics of the International, Moderne and Bay (Regional) Tradition styles: flat roof with overhanging eaves supported by slender pipe columns; exposed rafters; corner windows; casement windows with horizontal muntins; curved east wall; board formed concrete wall surface; and lap wood siding. Character-defining features of Building 267 are similar to Quarters 10 and include the lap wood siding, board formed concrete wall surface, flat roof with overhanging eaves, and exposed rafter tails.

The Senior Officers' Quarters Historic District (Map Reference No. 3) is listed in the National Register. The property is significant at the local level under Criterion A, for its association with the early development of military facilities on the West Coast, and under Criterion C, as significant examples of Classical Revival/Colonial Revival residential architecture. The period of significance for the district extends from 1900, when the first building was constructed, to 1947, when the station was decommissioned as a "Receiving Ship" facility and ceased its operations as a naval training and distribution center. The character-defining features of the district include its setting: relationship between each contributing building, size and massing of



buildings, landscaping (greensward in front of Quarters 1-3, formal terraced garden behind Quarters 1, central terraced garden behind Quarters 2-5, planting beds adjacent to each building, and hardscape, such as walkways, patios, masonry walls, and roadways); historic integrity of individual contributors (Quarters 1 through 7, Quarters 10, Buildings 267, 83, 205 and 230, and the landscape within the district boundary); the Classical Revival/Colonial Revival architecture; and view shed from Quarters 1-5. Additionally, Quarters 1, also known as the Nimitz House, is listed in the National Register as an individual property and is significant under Criterion A, for its association with the development of West Coast military facilities, and under Criterion C, as an important example of Classical Revival architecture. Its period of significance is identified as 1898-1916. Its character-defining features of this building consists of those architectural features that contribute to its Classical Revival style including, but not limited to, its size and massing, symmetrical façade, brick foundation, porch with portico, dormers, weatherboard siding with decorative cornerboards, stringcourse between first and second floors, flared eaves with box cornices and frieze, brick chimneys, and multi-light wood windows.

The SFOBB is listed in the National Register and is significant at the national level under Criterion A, for its important influence on transportation in San Francisco Bay Area and the state as a whole. The bridge is also significant for its engineering design (Criterion C). Its period of significance, as identified on the National Register nomination form, is 1936. The nomination lists six contributing buildings and nine contributing buildings within the bridge property, for a total of fifteen contributing elements.<sup>18</sup>

While some changes to setting were noted to these historic properties, all appear to retain sufficient historic integrity to convey their respective significance; therefore, no change in National Register-status is warranted for any of these properties.

The following tables summarize the conclusions of this report:

**Table 1. Properties Listed in the National Register**

Map Reference No.	Name	Year Built	OHP Status Code
2	Quarters 10 & Building 267	1948	1S
3	Senior Officers' Quarters Historic District	1900-1944	1S
4	San Francisco-Oakland Bay Bridge	1936	1S

**Table 2. Properties Previously Determined Eligible for the National Register**

Map Reference No.	Name	Year Built	OHP Status Code
1	Quarters 8	1905	2S2

**Table 3. Properties Previously Determined Not Eligible for the National Register**

<sup>18</sup> California Office of Historic Preservation, "National Register of Historic Places Registration Form, San Francisco-Oakland Bay Bridge," prepared by John J. Mascitelli in March 1999, revised by Karen Oriegel and Sean Riley in August 1999.



None

**Table 4. Properties Determined Eligible for the National Register As a Result of the Current Study**

None

**Table 5. Resources That Are Historical Resources for the Purposes of CEQA**

Map Reference No.	Name	Year Built	OHP Status Code
1	Quarters 8	1905	2S2
2	Quarters 10 & Building 267	1948	1S
3	Senior Officers' Quarters Historic District	1900-1944	1S
4	San Francisco-Oakland Bay Bridge	1936	1S

**Table 6. Properties Determined Not Eligible for the National Register As a Result of the Current Study**

None

**Table 7. Resources That Are Not Historical Resources Under CEQA Per CEQA Guidelines §15064.5 Because They Do Not Meet the California Register Criteria Outlined in PRC §5024.1**

None

## 6. REFERENCES

California Historic Information System (CHRIS), August 8, 2005.

California Office of Historic Preservation. "National Register of Historic Places Registration Form, San Francisco-Oakland Bay Bridge." Prepared by John J. Mascitelli, March 1999, revised by Karen Oriegel and Sean Riley in August 1999.

Caltrans. "Historic Property Survey Report for the Proposed Seismic Retrofit of the San Francisco-Oakland Bay Bridge (EA 012000)" Revision 0. 1995.

Caltrans District 4. "Findings of Adverse Effect: Buildings and Structures, San Francisco-Oakland Bay Bridge East Span Seismic Safety Project, EA 012000." September 1998.

HABS No. CA-1793-A through M.

HAER No. CA-32.

Hice, E. and D. Schierling. "Historical Study of Yerba Buena Island, Treasure Island, and their Buildings," Mare Island Naval Shipyard, Base Realignment and Closure, Revision 1. Prepared for Environmental Department, Naval Station. March 1996.

JRP Historical Consulting Services. "Cultural Resources Inventory and Evaluation Investigations: Yerba Buena Island and Treasure Island Naval Station Treasure Island, San Francisco, California." Prepared for Engineering Field Activity, West, Naval Facilities Engineering Command. March 1997.

\_\_\_\_\_. DPR 523 Form for Quarters 8. January 1997.

\_\_\_\_\_. "History and Historic Resources of the Military in California, 1796 to 1989," Volume II of *California Historic Military Buildings and Structures Inventory*. Prepared for the US Army Corps of Engineers, Sacramento District. March 2000.

SulTech and Tetra Tech EM Inc. "Final Finding of Suitability to Transfer for Property on Yerba Buena Island, Naval Station Treasure Island, San Francisco, California." March 22, 2006.

## 7. PREPARERS' QUALIFICATIONS

This project was conducted under the general direction of Rebecca M. Bunse (M.A. in Public History, California State University, Sacramento), a partner at JRP with more than 19 years experience conducting these types of studies. Ms. Bunse consulted on the development of the APE, provided overall guidance, and edited the report. Based on her level of experience and education, Ms. Bunse qualifies as a historian/architectural historian under the Secretary of the Interior's Professional Qualification Standards (as defined in 36 CFR Part 61).

JRP architectural historian Toni Webb was the lead historian for this project. Ms. Webb prepared the contextual statement and evaluations, as well as conducted fieldwork, and prepared the updated DPR forms. Ms. Webb received a B.F.A. in Historic Preservation from the Savannah College of Art & Design and has over ten years of experience in public history and historic preservation. Based on her level of experience and education, Ms. Webb qualifies as an architectural historian under the Secretary of the Interior's Professional Qualification Standards (as defined in 36 CFR Part 61).



## Appendix A

### Maps





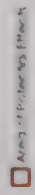
Map 1. Project Location and Vicinity







1 inch equals 2,000 feet



01.09





**Historic Architectural Focused Area of Potential Effect  
Alternative 2b**

**Yerba Buena Island  
Ramps Improvement Project**



**Alternative 2b Proposed Ramps**

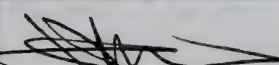


- Proposed West Bound Off-Ramp
- Proposed West Bound On-Ramp
- Proposed Macalla Road Improvements

□ Area of Potential Effect

**Separate Project Currently Under Construction**

- San Francisco-Oakland Bay Bridge East Span Seismic Safety Project
- Transition Structure Portion of SFOBB

**# Map Reference**

	10/24/08
Caltrans Project Manager	Date
	10/23/08
Mary K. Smith	Date
	10/23/08
EBAW Project Manager	Date

**Map 3. Focused APE**

Historic Architectural Focused Area of Potential Effect  
Alternative 4

Yerba Buena Island  
Ramps Improvement Project



**Alternative 4 Proposed Ramps**

- Proposed West Bound Off-Ramp
- Proposed West Bound On-Ramp
- Proposed Macalla Road Improvements

Area of Potential Effect

**Separate Project Currently Under Construction**

- San Francisco-Oakland Bay Bridge  
East Span Seismic Safety Project
- Transition Structure Portion of SFOBB

# Map Reference

Image: NIMA/USGS 2004  
Data: DMM/Harris/EDAW  
5/09

0 100 200 300 Feet

Map 3. Focused APE

**Appendix B**  
**DPR 523 Forms**





State of California – The Resources Agency  
DEPARTMENT OF PARKS AND RECREATION  
**UPDATE SHEET**

Primary # \_\_\_\_\_  
HRI # \_\_\_\_\_  
Trinomial \_\_\_\_\_  
NRHP Status Code 2S2

Page 1 of 3 ☐ Continuation ☒ Update

\*Resource Name or # Map Reference No. 1

**P1. Other Identifier:** Quarters 8

**\*P3a. Description:** Quarters 8 has been field checked and the building does not appear to have been physically altered since last recorded in 1996. However, the overall setting of this property has been temporarily altered by the use of the northernmost portion of the property (immediately adjacent to this building) for a staging area for the construction of the new East Span of the San Francisco-Oakland Bay Bridge (SFOBB).

**\*P3b. Resource Attributes:** (HP34) Military property; (HP2) Single-Family Property

**\*P8. Recorded by:** Toni Webb, JRP Historical Consulting, LLC, 1490 Drew Ave, Suite 110, Davis, CA 95618

**\*P9. Date Recorded:** November 2008

**\*P11. Report Citation:** JRP Historical Consulting, LLC, "Historical Resources Evaluation Report, Yerba Buena Island Ramps Improvement Project, San Francisco, California, 04-SF-80, PM 12.6-13.1/7.8-8.1

**\*B10. Significance:**

JRP Historical Consulting, LLC previously inventoried and evaluated Quarters 8 in 1997 as part of the report entitled "Cultural Resources Inventory and Evaluation Investigations: Yerba Buena Island and Treasure Island Naval Station Treasure Island, San Francisco, California." That report concluded that Quarters 8 appeared to be eligible for listing in the National Register of Historic Places (and subsequently the California Register of Historical Resources) at the local level under Criterion A, within the context of military history. The evaluation noted that Quarters 8 is a "rare remnant of the turn-of-the-century Naval Training Station on Yerba Buena Island, and apparently as the last vestige of the Marine Corps presence on the island." It also appeared to be eligible under Criterion C, as an unusual example of Mediterranean-style architecture, as well as the work of the master architectural firm of the Reid Brothers. The State Historic Preservation Office (SHPO) concurred with those findings in 1998.<sup>1</sup> The 1997 evaluation identified the period of significance as spanning 42 years beginning in 1905, when the building was constructed, to 1947, an arbitrary 50 year cut-off date. However, no character-defining features were identified, nor was a verbal or graphic description of the property's boundary stated. Review of historical and modern aerials show that Quarters 8 was bounded to the east and northwest by Hillcrest Road and to the south by Treasure Island Road from at least the 1940s to the early 2000s, when the construction of the new East Span of the SFOBB began. This appears to have been the property boundary at the time this building was evaluated in 1997 and would be the current boundary of this historic property.<sup>2</sup> Presently, the character-defining features of Quarters 8 would include its massing, recessed third floor, symmetrical façade, smooth stucco and wood siding, parapets, full-width front porch with square columns and solid railing, second-floor balcony, hip roof with box cornice and block modillions, and original fifteen-over-one, twelve-over-one, and eight-over-one double hung wood windows, exterior brick chimneys, and triangular-shaped property.

Although construction measures have encroached upon and altered the historic boundary of Quarters 8, the effects of this intrusion is temporary and will be mitigated with the restoration of the grounds of Quarters 8, as stipulated by the Memorandum of Agreement (MOA) for the San Francisco-Oakland Bay Bridge East Span Seismic Safety Project.<sup>3</sup> Therefore, the alterations to this historic property since its last documentation in 1997 will not diminish the property's overall importance, as the property will still maintain integrity of location, association, materials, design and workmanship and will continue to convey its significance under Criteria A and C. No change to its National Register or California Register status is warranted. This property is considered a historical resource for the purposes of CEQA.

**\*B14. Evaluator:** Toni Webb

**\*Date of Evaluation:** November 2008

<sup>1</sup> SHPO generally concurred with the finding of this report in October 1997 (SHPO Reference USN 970708A) but requested clarification on some buildings, including the Senior Officers' Quarters Historic District. Final concurrence was obtained in 1998. Caltrans, "Historic Property Survey Report, San Francisco-Oakland Bay Bridge East Span Seismic Safety Project," EA 01200 (September 1998).

<sup>2</sup> Caltrans, "Findings of Adverse Effect: Buildings and Structures, San Francisco-Oakland Bay Bridge East Span Seismic Safety Project," EA 01200 (September 1998) 8-11.

<sup>3</sup> "Memorandum of Agreement Among the Federal Highway Administration, the Department of the Navy, the United States Coast Guard, the California State Historic Preservation Officer, and the Advisory Council on Historic Preservation for the Bay Bridge East Span Seismic Safety Project in San Francisco and Alameda Counties, California," May 26, 2000.

State of California – The Resources Agency  
DEPARTMENT OF PARKS AND RECREATION  
**UPDATE SHEET**

Primary # \_\_\_\_\_  
HRI # \_\_\_\_\_  
Trinomial \_\_\_\_\_

NRHP Status Code 2S2

Page 2 of 3

☐ Continuation ☒ Update

\*Resource Name or # Map Reference No. 1

**Photographs:**



Photograph 1. View of Quarters 8 showing main façade (east side), camera facing west.



Photograph 2. View of Quarters 8 showing north side camera facing southwest.



State of California – The Resources Agency  
DEPARTMENT OF PARKS AND RECREATION  
**UPDATE SHEET**

Primary # \_\_\_\_\_  
HRI # \_\_\_\_\_  
Trinomial \_\_\_\_\_

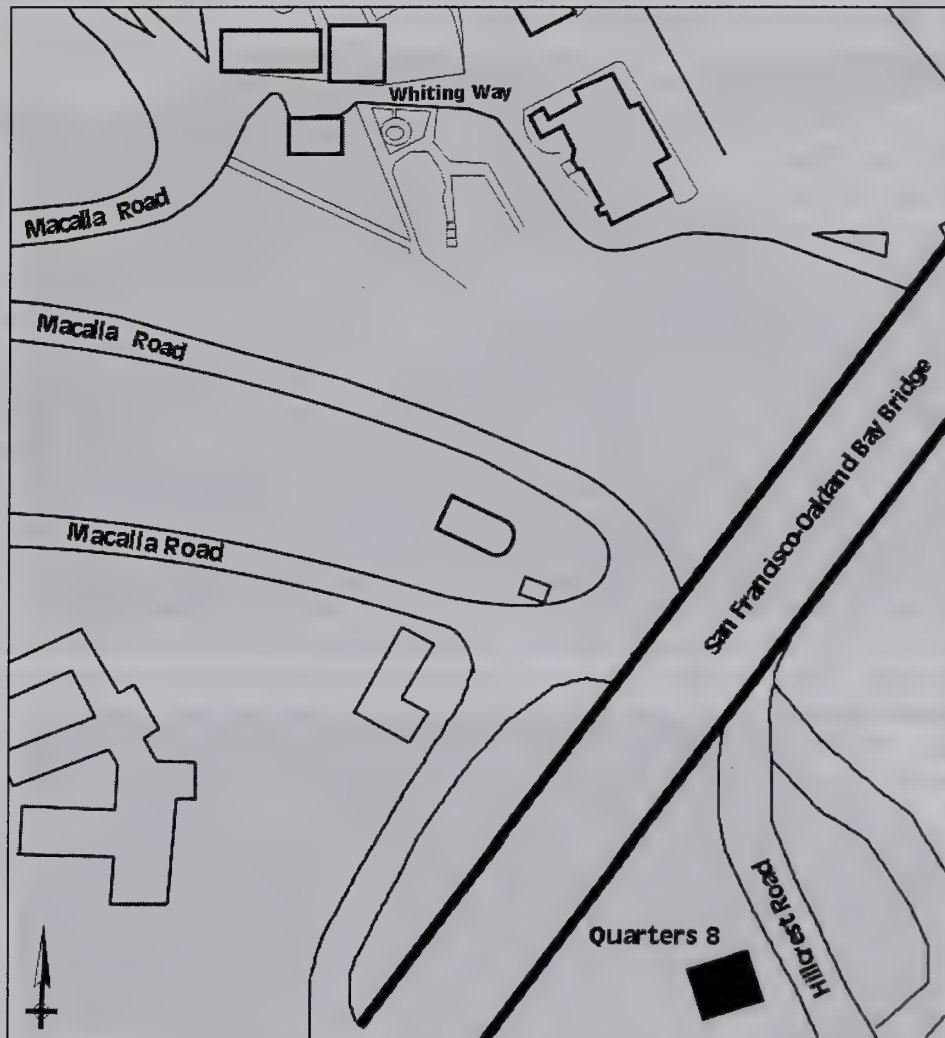
NRHP Status Code 2S2

Page 3 of 3

☐ Continuation ☒ Update

\*Resource Name or # Map Reference No. 1

**Sketch Map:**



State of California – The Resources Agency  
DEPARTMENT OF PARKS AND RECREATION  
**UPDATE SHEET**

Primary # \_\_\_\_\_

HRI # \_\_\_\_\_

Trinomial \_\_\_\_\_

NRHP Status Code 1S

Page 1 of 3

☐ Continuation ☒ Update

\*Resource Name or # Map Reference No. 2

**P1. Other Identifier:** Quarters 10

**\*P3a. Description:** Quarters 10 and its associated garage (Building 267) have been field checked and neither building appears to have been physically altered since their last recorded in 2003.

**\*P3b. Resource Attributes:** (HP34) Military property; (HP2) Single-Family Property

**\*P8. Recorded by:** Toni Webb, JRP Historical Consulting, LLC, 1490 Drew Ave, Suite 110, Davis, CA 95618

**\*P9. Date Recorded:** November 2008

**\*P11. Report Citation:** JRP Historical Consulting, LLC, "Historical Resources Evaluation Report, Yerba Buena Island Ramps Improvement Project, San Francisco, California, 04-SF-80, PM 12.6-13.1/7.8-8.1

**\*B10. Significance:**

Caltrans previously inventoried and evaluated Quarters 10 in 1998 as part of the report entitled "Historic Architecture Survey Report for the Construction of a New East Span for the San Francisco-Oakland Bay Bridge." As a result of that survey, Caltrans found that Quarters 10 and its associated garage (Building 267 as a contributing structure) appeared to be eligible for listing in the National Register of Historic Places (National Register) at the local level of significance under Criterion C, as significant example of mid twentieth century residential architecture. The State Historic Preservation Office concurred with those findings in 1998. Five years later, in 2003, JRP completed a National Register nomination for the district and in February 2008, this property was listed in the National Register and California Register of Historical Resources (California Register).<sup>1</sup> The property boundary includes Quarters 10, Building 267, the landscape immediately adjacent to these buildings including lawn and garden, driveway, and the northern retaining wall. The period of significance for this property is 1948, the year of its construction. Both the 1998 survey and 2003 nomination identified the character-defining of Quarters 10 as representing those distinctive architectural characteristics of the International, Moderne and Bay (Regional) Tradition styles. These include the flat roof with overhanging eaves supported by slender pipe columns; exposed rafters; corner windows; casement windows with horizontal muntins; curved east wall; board formed concrete wall surface; and lap wood siding. While neither inventory identified character-defining features of Building 267, they are similar to Quarters 10 and include the lap wood siding, board formed concrete wall surface, flat roof with overhanging eaves, and exposed rafter tails.

Because the property has been unaltered since its last recordation, no change to its National Register or California Register status is warranted. This property is considered a historical resource for the purposes of CEQA.

**\*B14. Evaluator:** Toni Webb

**\*Date of Evaluation:** November 2008

<sup>1</sup> National Register Information System Reference No. 08000084.  
DPR 523L (1/95)

**Photographs:**



Photograph 1. View of Quarters 10 (right) and Building 267 (left), camera facing west.



Photograph 2. View of Quarters 10, camera facing southwest.



State of California – The Resources Agency  
DEPARTMENT OF PARKS AND RECREATION  
**UPDATE SHEET**

Primary # \_\_\_\_\_  
HRI # \_\_\_\_\_  
Trinomial \_\_\_\_\_  
NRHP Status Code 1S

Page 3 of 3

☐ Continuation ☒ Update

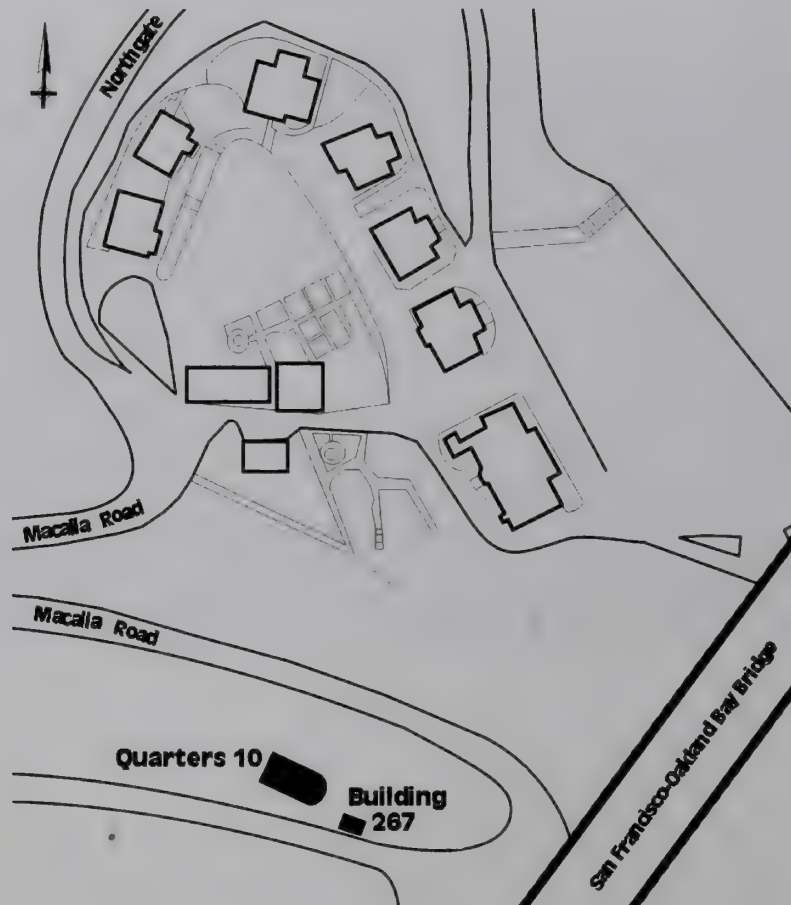
\*Resource Name or # Map Reference No. 2

**Photographs:**



Photograph 3. View of Building 267, camera facing southwest.

**Sketch Map:**



Page 1 of 8

☐ Continuation ☒ Update

\*Resource Name or # Map Reference No. 3

**P1. Other Identifier:** Senior Officers' Quarters Historic District

**\*P3a. Description:** The Senior Officers' Quarters Historic District includes eleven contributing elements: seven residences (Quarters 1 through 7), two apartments over garages (Buildings 83 and 230), a five-car garage (Building 205), and the landscape that surrounds the district. All of these elements have been field checked and none appear to have been physically altered since their last recorded in 2003. However, the overall setting of the district has been and will be somewhat altered by the on-going construction of the new East Span of the San Francisco-Oakland Bay Bridge (SFOBB) immediately south and west of the historic district.

**\*P3b. Resource Attributes:** (HP34) Military property; (HP2) Single-Family Property

**\*P8. Recorded by:** Toni Webb, JRP Historical Consulting, LLC, 1490 Drew Ave, Suite 110, Davis, CA 95618

**\*P9. Date Recorded:** November 2008

**\*P11. Report Citation:** JRP Historical Consulting, LLC, "Historical Resources Evaluation Report, Yerba Buena Island Ramps Improvement Project, San Francisco, California, 04-SF-80, PM 12.6-13.1/7.8-8.1

**\*B10. Significance:**

JRP Historical Consulting, LLC (JRP) previously inventoried and evaluated this property in 1997 as part of the report entitled "Cultural Resources Inventory and Evaluation Investigations: Yerba Buena Island and Treasure Island Naval Station Treasure Island, San Francisco, California." That report concluded that the district appeared to be eligible for listing in the National Register of Historic Places (National Register) at the local level under Criterion A, for its association with the early development of military facilities on the West Coast, and under Criterion C, as significant examples of Classical Revival/Colonial Revival residential architecture. The State Historic Preservation Office (SHPO) concurred with those findings in 1998.<sup>1</sup> Five years later, in 2003, JRP completed a Historic American Building Survey (HABS No. CA-1793-A through -K) and National Register nomination for the district. The nomination refined and clarified the previously-identified district boundary and the period of significance. The boundary of the district is shown in the attached sketch map on page 2. The period of significance for the district extends from 1900, when the first building was constructed, to 1947, when the station was decommissioned as a "Receiving Ship" facility and ceased its operations as a naval training and distribution center. Additionally, the nomination recognized important characteristics of the districts which were not identified in the 1997 survey. The character-defining features of the Senior Officers' Quarters Historic District include its setting: relationship between each contributing building, size and massing of buildings, landscaping (greensward in front of Quarters 1-3, formal terraced garden behind Quarters 1, central terraced garden behind Quarters 2-5, planting beds adjacent to each building, and hardscape, such as walkways, patios, masonry walls, and roadways); historic integrity of individual contributors (Quarters 1 through 7, Quarters 10, Buildings 267, 83, 205 and 230, and the landscape within the district boundary); the Classical Revival/Colonial Revival architecture; and view shed from Quarters 1-5.

In February 2008 the Senior Officers' Quarters Historic District was listed in the National Register and California Register of Historical Resources (California Register). Additionally in September 1991, Quarters 1, which is commonly referred to as the Nimitz Residence, was previously listed in the National Register and California Register for its significance with West Coast military historic (Criterion A) and as a significant example of Classical Revival architecture (Criterion C). Its period of significance extends from 1898 to 1916.<sup>2</sup> The character-defining features of this building consists of those architectural features that contribute to its Classical Revival style including, but not limited to, its size and massing, symmetrical façade, brick foundation, porch with portico, dormers, weatherboard siding with decorative cornerboards, stringcourse between first and second floors, flared eaves with box cornices and frieze, brick chimneys, and multi-light wood windows.

<sup>1</sup> SHPO generally concurred with the finding of this report in October 1997 (SHPO Reference USN 970708A) but had questions regarding some resources evaluated, including the Senior Officers' Quarters Historic District. Final concurrence from SHPO was obtained in 1998. Caltrans, Historic Property Survey Report, San Francisco-Oakland Bay Bridge East Span Seismic Safety Project, EA 01200 (September 1998).

<sup>2</sup> National Register Information System Reference Nos. 08000085 and 91001380; HABS No. CA-233-A (1998).



While the visual intrusion from the construction of the new East Bay Span of SFOBB has currently altered the district's integrity of setting and feeling, this change is minimal and does not diminish the property's overall historical importance. The property maintains integrity of location, association, materials, design and workmanship and conveys its significance under Criteria A and C, and therefore, no change to its National Register or California Register status is warranted. This property is considered a historical resource for the purposes of CEQA.

\*B14. Evaluator: Toni Webb

\*Date of Evaluation: November 2008

### Sketch Map:



\*Boundary of the Officers Quarters Historic District is shown with dotted line.



**Photographs:**



Photograph 1. View of historic district along Whiting Way, showing Quarters 1, 2 and 3 (left to right), camera facing north.



Photograph 2. View of Quarters 1, camera facing northwest.

State of California – The Resources Agency  
DEPARTMENT OF PARKS AND RECREATION  
**UPDATE SHEET**

Primary # \_\_\_\_\_  
HRI # \_\_\_\_\_  
Trinomial \_\_\_\_\_

NRHP Status Code 1S

Page 4 of 8

☐ Continuation ☒ Update

\*Resource Name or # Map Reference No. 3

**Photographs:**



Photograph 3. View of Quarters 2, camera facing south.



Photograph 4. View of Quarters 3, camera facing northwest.

State of California – The Resources Agency  
DEPARTMENT OF PARKS AND RECREATION  
**UPDATE SHEET**

Primary # \_\_\_\_\_  
HRI # \_\_\_\_\_  
Trinomial \_\_\_\_\_

NRHP Status Code 1S

Page 5 of 8

☐ Continuation ☒ Update

\*Resource Name or # Map Reference No. 3

**Photographs:**



Photograph 5. View of Quarters 4, camera facing northwest.



Photograph 6. View of Quarters 5, camera facing north.



State of California – The Resources Agency  
DEPARTMENT OF PARKS AND RECREATION  
**UPDATE SHEET**

Primary # \_\_\_\_\_  
HRI # \_\_\_\_\_  
Trinomial \_\_\_\_\_

NRHP Status Code 1S

Page 6 of 8

☐ Continuation ☒ Update

\*Resource Name or # Map Reference No. 3

**Photographs:**



Photograph 7. View of Quarters 6, camera facing west.



Photograph 8. View of Quarters 7, camera facing east.

State of California – The Resources Agency  
DEPARTMENT OF PARKS AND RECREATION  
**UPDATE SHEET**

Primary # \_\_\_\_\_  
HRI # \_\_\_\_\_  
Trinomial \_\_\_\_\_

NRHP Status Code 1S

Page 7 of 8

☐ Continuation ☒ Update

\*Resource Name or # Map Reference No. 3

**Photographs:**



Photograph 9. View of Buildings 205 (left) and 83 (right), camera facing northeast.

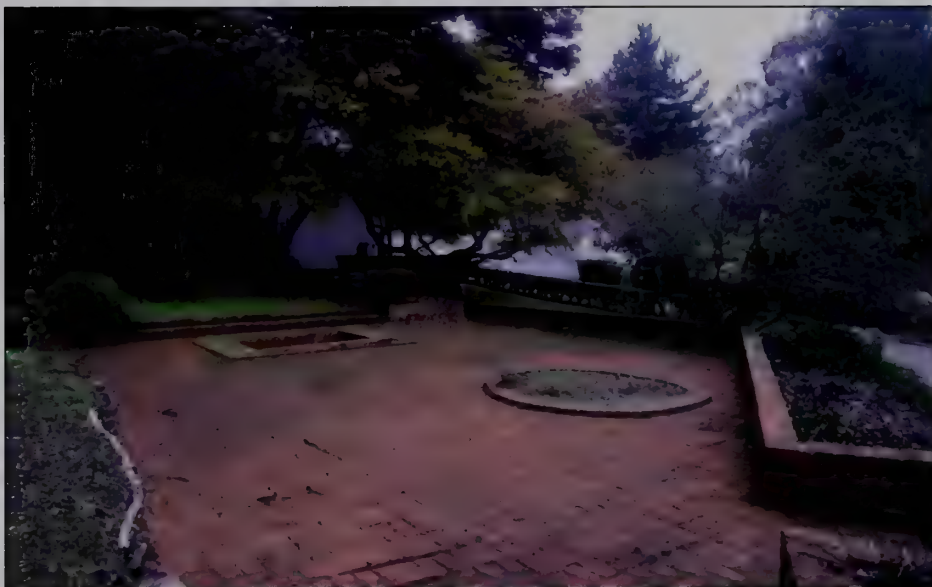


Photograph 10. View of Buildings 230, camera facing south.

**Photographs:**



Photograph 11. View of landscape behind (west) Quarters 1, camera facing west.



Photograph 12. View of landscape behind (west) Quarters 1, camera facing northwest.



## **Appendix C**

### **Letters to Interested Parties**



Partners  
Rand F. Herbert  
Stephen R. Wee  
Meta Bunse  
Christopher McMorris

December 11, 2008

Jack Gold, Executive Director  
San Francisco Architectural Heritage  
2007 Franklin Street  
San Francisco, CA 94109

RE: Yerba Buena westbound on- and off-ramps, San Francisco-Oakland Bay Bridge

Dear Sir:

San Francisco County Transportation Authority (SFCTA) proposes the replacement of westbound on- and off-ramps to the San Francisco-Oakland Bay Bridge (SFOBB) on the east side of Yerba Buena Island. The proposed project would improve the seismic, traffic safety requirements, and design standards of the current ramps. SFCTA, in cooperation with the Caltrans, is preparing an Environmental Impact Report / Environmental Impact Statement (EIR/EIS) for the project, in accordance with the National Environmental Policy Act (NEPA) and the California Environmental Quality Act (CEQA). SFTA is the Lead Agency under CEQA, while Caltrans is the lead agency under NEPA. Maps depicting the project location and vicinity are attached.

SFCTA has formed a consultant team to perform preliminary engineering and environmental technical studies to meet these state and federal environmental requirements. JRP Historical Consulting, LLC, is part of this team and is preparing a technical study of the historic architectural and engineering resources in the proposed project area. Historical resources are those properties potentially eligible, determined eligible, or listed in the National Register of Historic Places or the California Register of Historical Resources. There are four historic properties within the proposed project area, three of which are currently listed in the National Register and California Register: the SFOBB, the Senior Officers Quarters Historic District, and Quarters 10 (including its garage, Building 267). The fourth historic property, Quarters 8, has been determined eligible for both the National Register and California Register. If you or your organization has any concerns regarding specific historic resources within the project area, please respond in writing to me at the address below citing your concerns within the next thirty days, or call me at (530) 757-2521.

Sincerely,



Rebecca Meta Bunse  
Partner



Partners  
Rand F. Herbert  
Stephen R. Wee  
Meta Bunse  
Christopher McMorris

**JRP**  
HISTORICAL CONSULTING, LLC

December 11, 2008

M. Bridget Maley, President  
San Francisco Landmark Preservation Advisory Board  
1660 Mission Street, Ste. 500  
San Francisco, CA 94103

RE: Yerba Buena westbound on- and off-ramps, San Francisco-Oakland Bay Bridge

Dear Madam:

San Francisco County Transportation Authority (SFCTA) proposes the replacement of westbound on- and off-ramps to the San Francisco-Oakland Bay Bridge (SFOBB) on the east side of Yerba Buena Island. The proposed project would improve the seismic, traffic safety requirements, and design standards of the current ramps. SFCTA, in cooperation with the Caltrans, is preparing an Environmental Impact Report / Environmental Impact Statement (EIR/EIS) for the project, in accordance with the National Environmental Policy Act (NEPA) and the California Environmental Quality Act (CEQA). SFTA is the Lead Agency under CEQA, while Caltrans is the lead agency under NEPA. Maps depicting the project location and vicinity are attached.

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Sincerely,



Rebecca Meta Bunse  
Partner

Partners  
Rand F. Herbert  
Stephen R. Wee  
Meta Bunse  
Christopher McMorris

December 11, 2008

Mark Luellen, Preservation Coordinator  
San Francisco Planning Department  
1650 Mission Street, Suite 400  
San Francisco, CA 94103

RE: Yerba Buena westbound on- and off-ramps, San Francisco-Oakland Bay Bridge

Dear Sir:

San Francisco County Transportation Authority (SFCTA) proposes the replacement of westbound on- and off-ramps to the San Francisco-Oakland Bay Bridge (SFOBB) on the east side of Yerba Buena Island. The proposed project would improve the seismic, traffic safety requirements, and design standards of the current ramps. SFCTA, in cooperation with the Caltrans, is preparing an Environmental Impact Report / Environmental Impact Statement (EIR/EIS) for the project, in accordance with the National Environmental Policy Act (NEPA) and the California Environmental Quality Act (CEQA). SFTA is the Lead Agency under CEQA, while Caltrans is the lead agency under NEPA. Maps depicting the project location and vicinity are attached.

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Sincerely,



Rebecca Meta Bunse  
Partner

Partners  
Rand F. Herbert  
Stephen R. Wee  
Meta Bunse  
Christopher McMorris

**JRP**  
HISTORICAL CONSULTING, LLC

December 11, 2008

Ron Ross, President  
San Francisco History Association  
PO Box 31907  
San Francisco, CA 94131


RE: Yerba Buena westbound on- and off-ramps, San Francisco-Oakland Bay Bridge

Dear Sir:

San Francisco County Transportation Authority (SFCTA) proposes the replacement of westbound on- and off-ramps to the San Francisco-Oakland Bay Bridge (SFOBB) on the east side of Yerba Buena Island. The proposed project would improve the seismic, traffic safety requirements, and design standards of the current ramps. SFCTA, in cooperation with the Caltrans, is preparing an Environmental Impact Report / Environmental Impact Statement (EIR/EIS) for the project, in accordance with the National Environmental Policy Act (NEPA) and the California Environmental Quality Act (CEQA). SFTA is the Lead Agency under CEQA, while Caltrans is the lead agency under NEPA. Maps depicting the project location and vicinity are attached.

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Sincerely,



Rebecca Meta Bunse  
Partner



Partners  
Rand F. Herbert  
Stephen R. Wee  
Meta Bunse  
Christopher McMorris

December 11, 2008

Erik Christoffersen, Executive Director  
San Francisco Museum and Historical Society  
P.O. Box 420470  
San Francisco, CA 94142-0470

RE: Yerba Buena westbound on- and off-ramps, San Francisco-Oakland Bay Bridge

Dear Sir:

San Francisco County Transportation Authority (SFCTA) proposes the replacement of westbound on- and off-ramps to the San Francisco-Oakland Bay Bridge (SFOBB) on the east side of Yerba Buena Island. The proposed project would improve the seismic, traffic safety requirements, and design standards of the current ramps. SFCTA, in cooperation with the Caltrans, is preparing an Environmental Impact Report / Environmental Impact Statement (EIR/EIS) for the project, in accordance with the National Environmental Policy Act (NEPA) and the California Environmental Quality Act (CEQA). SFTA is the Lead Agency under CEQA, while Caltrans is the lead agency under NEPA. Maps depicting the project location and vicinity are attached.

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Sincerely,



Rebecca Meta Bunse  
Partner

Partners  
Rand F. Herbert  
Stephen R. Wee  
Meta Bunse  
Christopher McMorris

**JRP**  
HISTORICAL CONSULTING, LLC

December 11, 2008

David Crosson, Executive Director  
California Historical Society  
678 Mission Street  
San Francisco CA 94105

RE: Yerba Buena westbound on- and off-ramps, San Francisco-Oakland Bay Bridge

Dear Sir:

San Francisco County Transportation Authority (SFCTA) proposes the replacement of westbound on- and off-ramps to the San Francisco-Oakland Bay Bridge (SFOBB) on the east side of Yerba Buena Island. The proposed project would improve the seismic, traffic safety requirements, and design standards of the current ramps. SFCTA, in cooperation with the Caltrans, is preparing an Environmental Impact Report / Environmental Impact Statement (EIR/EIS) for the project, in accordance with the National Environmental Policy Act (NEPA) and the California Environmental Quality Act (CEQA). SFTA is the Lead Agency under CEQA, while Caltrans is the lead agency under NEPA. Maps depicting the project location and vicinity are attached.

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Sincerely,



Rebecca Meta Bunse  
Partner

Partners  
Rand F. Herbert  
Stephen R. Wee  
Meta Bunse  
Christopher McMorris

December 11, 2008

Leigh Ann Baughman, Executive Director  
San Francisco Beautiful  
564 Market Street, Suite 709  
San Francisco, CA 94104

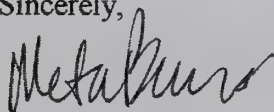
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Sincerely,



Rebecca Meta Bunse  
Partner



Partners  
Rand F. Herbert  
Stephen R. Wee  
Meta Bunse  
Christopher McMorris

**JRP**  
HISTORICAL CONSULTING, LLC

December 11, 2008

William Applegate, President  
California Heritage Council  
P.O. Box 475046  
San Francisco, CA 94147

RE: Yerba Buena westbound on- and off-ramps, San Francisco-Oakland Bay Bridge

Dear Sir:

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Sincerely,



Rebecca Meta Bunse  
Partner

## Partners

Rand F. Herbert  
Stephen R. Wee  
Meta Bunse  
Christopher McMorris

December 11, 2008

Cindy Heitzman, Executive Director  
California Preservation Foundation  
5 Third St., Ste 424  
San Francisco, CA 94103

RE: Yerba Buena westbound on- and off-ramps, San Francisco-Oakland Bay Bridge

Dear Madam:

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Sincerely,



Rebecca Meta Bunse  
Partner

Partners  
Rand F. Herbert  
Stephen R. Wee  
Meta Bunse  
Christopher McMorris

**JRP**  
HISTORICAL CONSULTING, LLC

December 11, 2008

Anthea Hartig Ph.D., Director  
National Trust for Historic Preservation Western Office  
5 Third Street, Suite 707  
San Francisco, California 94103

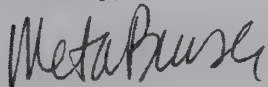
RE: Yerba Buena westbound on- and off-ramps, San Francisco-Oakland Bay Bridge

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Sincerely,



Rebecca Meta Bunse  
Partner



Partners  
Rand F. Herbert  
Stephen R. Wee  
Meta Bunse  
Christopher McMorris

December 11, 2008

John J. Reynolds, Director  
National Park Service, Pacific West Region Office  
1111 Jackson Street, Suite 700  
Oakland, California 94607

RE: Yerba Buena westbound on- and off-ramps, San Francisco-Oakland Bay Bridge

Dear Sir:

San Francisco County Transportation Authority (SFCTA) proposes the replacement of westbound on- and off-ramps to the San Francisco-Oakland Bay Bridge (SFOBB) on the east side of Yerba Buena Island. The proposed project would improve the seismic, traffic safety requirements, and design standards of the current ramps. SFCTA, in cooperation with the Caltrans, is preparing an Environmental Impact Report / Environmental Impact Statement (EIR/EIS) for the project, in accordance with the National Environmental Policy Act (NEPA) and the California Environmental Quality Act (CEQA). SFTA is the Lead Agency under CEQA, while Caltrans is the lead agency under NEPA. Maps depicting the project location and vicinity are attached.

SFCTA has formed a consultant team to perform preliminary engineering and environmental technical studies to meet these state and federal environmental requirements. JRP Historical Consulting, LLC, is part of this team and is preparing a technical study of the historic architectural and engineering resources in the proposed project area. Historical resources are those properties potentially eligible, determined eligible, or listed in the National Register of Historic Places or the California Register of Historical Resources. There are four historic properties within the proposed project area, three of which are currently listed in the National Register and California Register: the SFOBB, the Senior Officers Quarters Historic District, and Quarters 10 (including its garage, Building 267). The fourth historic property, Quarters 8, has been determined eligible for both the National Register and California Register. If you or your organization has any concerns regarding specific historic resources within the project area, please respond in writing to me at the address below citing your concerns within the next thirty days, or call me at (530) 757-2521.

Sincerely,



Rebecca Meta Bunse  
Partner

Partners  
Rand F. Herbert  
Stephen R. Wee  
Meta Bunse  
Christopher McMorris

**JRP**  
HISTORICAL CONSULTING, LLC

December 11, 2008

Valerie Garry, President  
Oakland Heritage Alliance  
446 17th Street, Suite 301  
Oakland, CA 94612

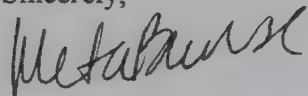
RE: Yerba Buena westbound on- and off-ramps, San Francisco-Oakland Bay Bridge

Dear Madam:

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Sincerely,



Rebecca Meta Bunse  
Partner

Partners  
Rand F. Herbert  
Stephen R. Wee  
Meta Bunse  
Christopher McMorris

December 11, 2008

Joann Pavlinec, Secretary & Historic Preservation Planner  
Oakland Landmarks Preservation Advisory Board  
250 Frank H. Ogawa Plaza, Suite 3315  
Oakland, CA 94612

RE: Yerba Buena westbound on- and off-ramps, San Francisco-Oakland Bay Bridge

Dear Madam:

San Francisco County Transportation Authority (SFCTA) proposes the replacement of westbound on- and off-ramps to the San Francisco-Oakland Bay Bridge (SFOBB) on the east side of Yerba Buena Island. The proposed project would improve the seismic, traffic safety requirements, and design standards of the current ramps. SFCTA, in cooperation with the Caltrans, is preparing an Environmental Impact Report / Environmental Impact Statement (EIR/EIS) for the project, in accordance with the National Environmental Policy Act (NEPA) and the California Environmental Quality Act (CEQA). SFTA is the Lead Agency under CEQA, while Caltrans is the lead agency under NEPA. Maps depicting the project location and vicinity are attached.

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Sincerely,



Rebecca Meta Bunse  
Partner



Partners  
Rand F. Herbert  
Stephen R. Wee  
Meta Bunse  
Christopher McMorris

**JRP**  
HISTORICAL CONSULTING, LLC

December 11, 2008

Betty Marvin, Planner  
Oakland Cultural Heritage Survey  
250 Frank Ogawa Plaza, Suite 3330  
Oakland, CA 94612

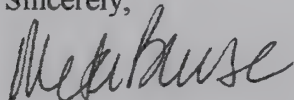
RE: Yerba Buena westbound on- and off-ramps, San Francisco-Oakland Bay Bridge

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Sincerely,



Rebecca Meta Bunse  
Partner

Partners  
Rand F. Herbert  
Stephen R. Wee  
Meta Bunse  
Christopher McMorris

December 11, 2008

Winton "Mac" McKibben, President  
Alameda County Historical Society  
PMB 307  
484 Lake Park Ave.

RE: Yerba Buena westbound on- and off-ramps, San Francisco-Oakland Bay Bridge

Dear Sir:

San Francisco County Transportation Authority (SFCTA) proposes the replacement of westbound on- and off-ramps to the San Francisco-Oakland Bay Bridge (SFOBB) on the east side of Yerba Buena Island. The proposed project would improve the seismic, traffic safety requirements, and design standards of the current ramps. SFCTA, in cooperation with the Caltrans, is preparing an Environmental Impact Report / Environmental Impact Statement (EIR/EIS) for the project, in accordance with the National Environmental Policy Act (NEPA) and the California Environmental Quality Act (CEQA). SFTA is the Lead Agency under CEQA, while Caltrans is the lead agency under NEPA. Maps depicting the project location and vicinity are attached.

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Sincerely,



Rebecca Meta Bunse  
Partner

Partners

Rand F. Herbert  
Stephen R. Wee  
Meta Bunse  
Christopher McMorris



December 11, 2008

Alameda County Parks, Recreation and Historical Commission  
224 West Winton Ave., #111  
Hayward, CA 94544

RE: Yerba Buena westbound on- and off-ramps, San Francisco-Oakland Bay Bridge

Dear Sir or Madam:

San Francisco County Transportation Authority (SFCTA) proposes the replacement of westbound on- and off-ramps to the San Francisco-Oakland Bay Bridge (SFOBB) on the east side of Yerba Buena Island. The proposed project would improve the seismic, traffic safety requirements, and design standards of the current ramps. SFCTA, in cooperation with the Caltrans, is preparing an Environmental Impact Report / Environmental Impact Statement (EIR/EIS) for the project, in accordance with the National Environmental Policy Act (NEPA) and the California Environmental Quality Act (CEQA). SFTA is the Lead Agency under CEQA, while Caltrans is the lead agency under NEPA. Maps depicting the project location and vicinity are attached.

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Sincerely,

A handwritten signature in dark ink, appearing to read "Meta Bunse". The signature is fluid and cursive, written over a horizontal line.

Rebecca Meta Bunse  
Partner





Figure 1. Project Location



Figure 2. Project Vicinity



## **Appendix D**

### **Previous Historic Documentation**





**OFFICE OF HISTORIC PRESERVATION  
DEPARTMENT OF PARKS AND RECREATION**

P.O. BOX 942896  
SACRAMENTO, CA 94296-0001  
(916) 653-6624 Fax: (916) 653-9824  
calshpo@ohp.parks.ca.gov



May 1, 2008

Douglas E. Gilkey  
1455 Frazee Road, Suite 900  
San Diego, California 92108-4310

RE: Senior Officers Quarters Historic District, Yerba Buena Island Listing on the  
National Register of Historic Places

Dear Mr. Gilkey:

I am pleased to notify you that on February 26, 2008, the above-named property was placed on the National Register of Historic Places (National Register). As a result of being placed on the National Register, this property has also been listed in the California Register of Historical Resources, pursuant to Section 4851(a)(2) of the Public Resources Code.

Placement on the National Register affords a property the honor of inclusion in the nation's official list of cultural resources worthy of preservation and provides a degree of protection from adverse affects resulting from federally funded or licensed projects. Registration provides a number of incentives for preservation of historic properties, including special building codes to facilitate the restoration of historic structures, and certain tax advantages.

There are no restrictions placed upon a private property owner with regard to normal use, maintenance, or sale of a property listed in the National Register. However, a project that may cause substantial adverse changes in the significance of a registered property may require compliance with local ordinances or the California Environmental Quality Act. In addition, registered properties damaged due to a natural disaster may be subject to the provisions of Section 5028 of the Public Resources Code regarding demolition or significant alterations, if imminent threat to life safety does not exist.

If you have any questions or require further information, please contact the Registration Unit at (916) 653-6624.

Sincerely,

A handwritten signature in black ink, reading "Milford Wayne Donaldson".

Milford Wayne Donaldson, FAIA  
State Historic Preservation Officer

**OFFICE OF HISTORIC PRESERVATION  
DEPARTMENT OF PARKS AND RECREATION**

P.O. BOX 942896  
SACRAMENTO, CA 94296-0001  
(916) 653-6624 Fax: (916) 653-9824  
calshpo@ohp.parks.ca.gov



May 1, 2008

Douglas E. Gilkey  
1455 Frazee Road, Suite 900  
San Diego, California 92108-4310

RE: Quarters 10 and Building 267, Yerba Buena Island Listing on the  
National Register of Historic Places

Dear Mr. Gilkey:

I am pleased to notify you that on February 26, 2008, the above-named property was placed on the National Register of Historic Places (National Register). As a result of being placed on the National Register, this property has also been listed in the California Register of Historical Resources, pursuant to Section 4851(a)(2) of the Public Resources Code.

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If you have any questions or require further information, please contact the Registration Unit at (916) 653-6624.

Sincerely,

Milford Wayne Donaldson, FAIA  
State Historic Preservation Officer



April 25, 2008

The Director of the National Park Service is pleased to send you the following announcements and actions on properties for the National Register of Historic Places. For further information contact Edson Beall via voice (202) 354-2255, or E-mail: <Edson\_Beall@nps.gov> This and past Weekly Lists are also available here: <http://www.nps.gov/history/nr/nrlist.htm>

Our physical location address is:

National Park Service 2280, 8th floor  
National Register of Historic Places  
1201 "I" (Eye) Street, NW,  
Washington D.C. 20005

Please have any Fed Ex, UPS packages sent to the above address. Please continue to use alternate carriers, as all mail delivered to us via United States Postal Service is irradiated and subsequently damaged.

Landscape Architecture Month:  
<http://www.nps.gov/history/nr/feature/landscape/index.htm>

WEEKLY LIST OF ACTIONS TAKEN ON PROPERTIES: 4/14/08 THROUGH 4/18/08

KEY: State, County, Property Name, Address/Boundary, City, Vicinity, Reference Number, NHL, Action, Date, Multiple Name

CALIFORNIA, SAN FRANCISCO COUNTY,  
Administration Building, Treasure Island, SE Corner of Avenue of the Palms and California Ave., Treasure Island, 08000081, LISTED, 2/26/08

CALIFORNIA, SAN FRANCISCO COUNTY,  
Hall of Transportation, Treasure Island, SE Side of California Ave. between Avenue D and Avenue F, Treasure Island, 08000082, LISTED, 2/26/08

CALIFORNIA, SAN FRANCISCO COUNTY,  
Palace of Fine and Decorative Arts, Treasure Island, SE Side of California Ave. between Avenue F and Avenue I, Treasure Island, 08000083, LISTED, 2/26/08

CALIFORNIA, SAN FRANCISCO COUNTY,  
Quarters 10 and Building 267, Yerba Buena Island, Jct. Northgate & Macalla Rds., North Shore of Yerba Buena Island, Yerba Buena Island, 08000084, LISTED, 2/26/08

State of California — The Resources Agency  
DEPARTMENT OF PARKS AND RECREATION  
**PRIMARY RECORD**

Primary # \_\_\_\_\_  
HRI # \_\_\_\_\_  
Trinomial \_\_\_\_\_  
NRHP Status Code \_\_\_\_\_

Other Listings \_\_\_\_\_  
Review Code \_\_\_\_\_ Reviewer \_\_\_\_\_ Date \_\_\_\_\_

Page 1 of 5

\*Resource Name or #: (Assigned by recorder) Quarters 8

P1. Other Identifier: Officers' Quarters

\*P2. Location: ☐ Not for Publication ☒ Unrestricted \*a. County San Francisco  
and P2c, P2e, and P2b or P2d. (Attach Location Map as necessary.)

\*b. USGS 7.5' Quad Oakland West Date 1980 T\_\_\_\_; R\_\_\_\_: \_\_\_\_% of \_\_\_\_% of Sec \_\_\_\_; \_\_\_\_ B.M.

c. Address Naval Station, Treasure Island City San Francisco Zip 94592-5100

d. UTM: (Give more than one for large and/or linear resources) Zone: \_\_\_\_\_; \_\_\_\_\_ mE/ \_\_\_\_\_ mN

\*e. Other Locational Data: (E.g., parcel #, directions to resource, elevation, etc., as appropriate.)

\*P3a. Description: (Describe resource and its major elements. Include design, materials, condition, alterations, size, setting, and boundaries.)

Quarters 8 is a three-story, woodframe residence, built at this site in 1905. It is a square box building on its first and second story and includes a recessed third story. The first and second story element is sided in stucco and terminates in an elaborate parapet. The third story is woodframe and sided in horizontal boards. (See continuation sheet.)

\*P3b. Resource Attributes: (See attributes and codes) HP34 Military Property: HP2 Single Family Property

\*P4. Resources Present: ☒ Building ☐ Structure ☐ Object ☐ Site ☐ District ☐ Element of District ☐ Other (Isolates, etc.)

P5a. Photo or Drawing (Photo required for buildings, structures, and objects.)



P5b. Description of Photo:

(View, date, accession #) \_\_\_\_\_

East facade, camera facing  
southwest.

\*P6. Date Constructed / Age and

Sources: ☒ Historic

☐ Prehistoric ☐ Both

1905

\*P7. Owner and Address:

Naval Station

Treasure Island

San Francisco, CA 94130

\*P8. Recorded by: (Name,  
affiliation, and address)

Stephen D. Mikesell

JRP Historical Consulting

1477 Drew Ave., Suite 105

Davis, CA 95616

\*P9. Date Recorded: 12/12/96

\*P10. Survey Type: (Describe)

Intensive

\*P11. Report Citation: (Cite Survey report and other sources, or enter "none.") Historical Study of Yerba Buena Island,

Treasure Island, and Their Buildings

\*Attachments: ☐ Location Map ☒ Sketch Map ☒ Continuation Sheet ☒  
☒ Building, Structure, and Object Record ☐ Linear Resource Record ☐ Archaeological Record ☐ District Record ☐ Milling  
Station Record ☐ Rock Art Record ☐ Artifact Record ☐ Photograph Record ☐ Other (List) \_\_\_\_\_



Page 3 of 5

\*NRPH Status Code \_\_\_\_\_

\*Resource Name or # (Assigned by recorder) Quarters 8

### DESCRIPTION (continued)

The differences in elevation and siding between the first and second story element and the third story element suggest at first glance that the third story was a later addition. Historic photographs confirm, however, that the building was designed in this manner and has not changed materially since its construction.<sup>1</sup>

The facade is dominated by a heavy porch with a solid rail balcony at its roofline. This porch serves as a balcony for the second story; the parapet atop the second story serves as a balcony for the setback third story. The main entry, centered on the front porch, includes a solid door with sidelights. Windows throughout the building are double hung wooden sash, with multiple lights on top: fifteen-over-one at the facade, twelve-over-one on the side elevations, and eight-over-one on the recessed third story. The building includes four separate chimneys, set at the four corners of the third story setback.

Quarters 8 appears to be almost completely unmodified. When constructed, the building included elaborate window surrounds on the first and second story element; these have all been removed. There is a single fixed pane, "picture window" to the left of the entry at the first story. These modifications are minor, when considered against the scale of the building.

### SIGNIFICANCE (continued)

Quarters 8 was built in 1905, at about the same time as the main compound of Senior Officers' Quarters at Yerba Buena Island (Quarters 1-7; these are treated separately as the Yerba Buena Senior Officers' Quarters Historic District). All eight homes were built at the outset of construction for the Naval Training Station at Yerba Buena Island, which was in operation on Yerba Buena Island between 1898 and 1923. Quarters 8, however, was separated physically from the other senior officers' quarters, situated hundreds of feet south and uphill from the main compound, and is unlike the other quarters from an architectural standpoint.

For reasons not explained in the historic record, the Bureau of Yards and Docks, with overall design and construction responsibility for the buildings at Yerba Buena Island, turned to a private architectural firm to design the entire Marine compound there. While there were exceptions, the Bureau of Yards and Docks designed the bulk of Navy and Marine Corps buildings during the early 20th century. The Bureau almost certainly designed the Colonial Revival Quarters 1-7, which are similar architecturally to the senior officers' quarters at Mare Island Naval Shipyard, built at about the same time. For the Marine compound at Yerba Buena, however, the Bureau hired the noted San Francisco architectural firms of the Reid Brothers.

The Reid Brothers, James and Merritt, comprised one of the most prolific turn-of-the-century architectural firms in California. Canadians by birth and training, the Reid brothers arrived in San Francisco in 1888. Almost immediately they began winning some of the most prized architectural commissions in the state, including: the Hotel del Coronado

<sup>1</sup> The building is shown in "The Work of the Reid Bros.," *Architect and Engineer of California*, XXIII, No. 1, Nov. 1910, p. 72.



CONTINUATION SHEET

Page 5 of 5

\*NRPH Status Code \_\_\_\_\_

\*Resource Name or # (Assigned by recorder) Quarters 8

is attributable to the design of the Reid Brothers firm, which was responsible for both the barracks and the commanding officer's quarters. The building also appears to qualify under National Register Criterion C, as the "work of a master." The Reid Brothers firm was responsible for some of the most important buildings in California, dating to the period from the late 1880s through the late 1910s, including the Hotel del Coronado and the Fairmont Hotel. While a modest example, Quarters 8 represents the only known military commission by the Reid Brothers firm and a relatively rare extant example of the firm's residential design.

State of California - The Resources Agency  
DEPARTMENT OF PARKS AND RECREATION  
**PRIMARY RECORD**

Primary # \_\_\_\_\_  
HRI # \_\_\_\_\_  
Trinomial \_\_\_\_\_  
NRHP Status Code 35

Other Listings \_\_\_\_\_  
Review Code \_\_\_\_\_ Reviewer \_\_\_\_\_ Date \_\_\_\_\_

Page 1 of 7

\*Resource Name or #: (Assigned by recorder) Quarters 10, Yerba Buena Island

P1. Other Identifier: \_\_\_\_\_

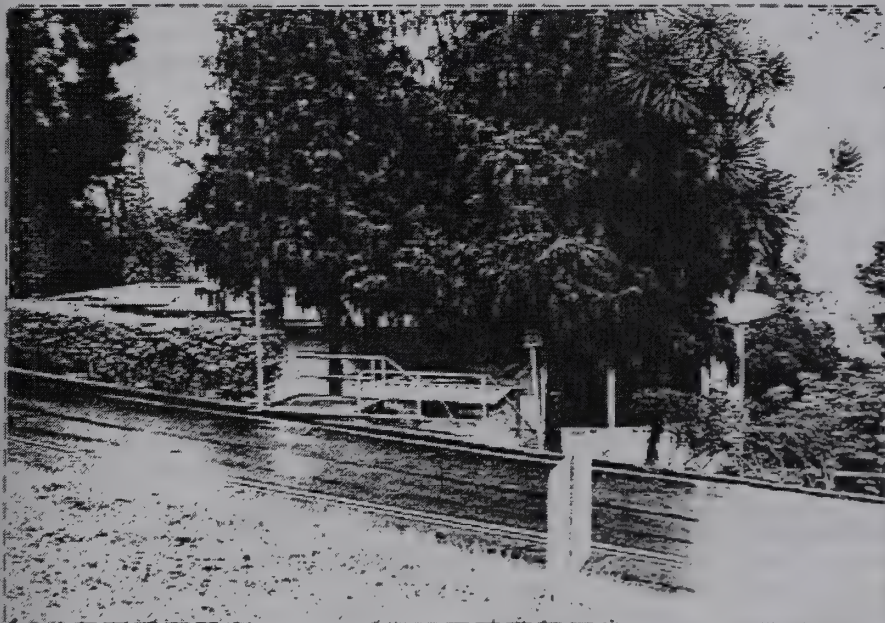
\*P2. Location: ☐ Not for Publication ☒ Unrestricted      \*a. County San Francisco  
and (P2b and P2c or P2d. Attach a Location Map as necessary.)  
\*b. USGS 7.5' Quad Oakland West Date T : R : 1/4 of 1/4 of Sec. : B. M.  
c. Address Naval Station Treasure Island City San Francisco Zip 94592  
d. UTM: (Give more than one for large and/or linear resources) Zone 10 : 556080 mE/ 4184950 mN  
e. Other Location Data: (e.g., parcel #, directions to resource, elevation, etc., as appropriate)

\*P3a. Description (Describe the resource and its major elements. Include design, materials, condition, alterations, size, setting & boundaries):

Quarters 10 is a two story residence constructed on a steep hillside site. The main floor is reached by a concrete stairway leading down from the adjacent road. The house has a flat roof with open eaves, and the walls are clad in narrow clapboards from the eaves down to the level of the window sills. The lower portion of the main floor and all of the lower floor walls are clad in flush board siding. The east end of the main floor is entirely glazed, with nine large windows (eight fixed sash and one paired casement) forming a semi-circle. This rounded extension overhangs a paved patio at the lower level, and is supported by four metal-pipe columns. The western end of the upper floor also overhangs a lower level patio and is supported by pipe columns. A series of indentations along the south facade give this portion of the house a jagged roofline and numerous corners, two of which have corner windows. The main floor windows are fixed sash and casements, most having just two horizontal muntins. The lower level patio is accessed from a modern sliding glass door. Another recent alteration is the metal awning that extends from the front door to the foot of the stairway leading up to the street. To the east of the house is a one-car garage (Navy building 267) that matches the construction of the house, with a flat roof and both clapboard and flush board siding.

\*P3b. Resource Attributes: (List attributes and codes) HP2 -- Single Family Residence: HP34 -- Military Property

\*P4. Resources present: ☒ Building ☐ Structure ☐ Object ☐ Site ☐ District ☐ Element of District ☐ Other



P5b. Description of Photo: (View, Date, etc.)  
View northwest January 1998

\*P6. Date Constructed / Age and Sources: ☒ Historic  
☐ Prehistoric ☐ Both  
1948 (Historical Study of Yerba Buena Island)

\*P7. Owner and Address:  
Naval Station Treasure Island  
San Francisco, CA 94130

\*P8. Recorded by: (Name, affiliation, and address) Andrew Hope  
Caltrans, District 4  
111 Grand Avenue  
Oakland, CA

\*P9. Date Recorded: April 1998

\*P10. Survey Type: (Describe)  
Intensive

\*P11. Report Citation (Cite survey report and other sources, or enter "none"): Historic Architecture Survey Report for the Construction of a New East Span for the San Francisco - Oakland Bay Bridge

\*Attachments: ☐ NONE ☒ Location Map ☐ Sketch Map ☒ Continuation Sheet ☒ Building, Structure & Object Record  
☐ Archaeological Record ☐ District Record ☐ Linear Feature Record ☐ Milling Station Record ☐ Rock Art Record  
☐ Artifact Record ☐ Photograph Record ☐ Other (List) \_\_\_\_\_



**BUILDING, STRUCTURE AND OBJECT RECORD**

Primary # \_\_\_\_\_  
HRI # \_\_\_\_\_

Page 2 of 7

\*NRHP Status Code 3S

\*Resource Name or # (Assigned by recorder) Quarters 10, Yerba Buena Island

B1. Historic Name: Quarters 10, Naval Station Treasure Island  
B2. Common Name: Quarters 10, Naval Station Treasure Island  
B3. Original Use: residence B4. Present Use: residence  
\*B5. Architectural Style: moderne / international  
\*B6. Construction History: (Construction date, alterations, and date of alterations)

This residence was built in 1948. Later alterations include the sliding glass door at the lower level and the metal canopy at the front entrance. The garage was also built in 1948.

\*B7. Moved? X No    Yes    Unknown Date: \_\_\_\_\_ Original Location: \_\_\_\_\_

\*B8. Related Features:

Building 267 is a garage associated with Quarters 10.

B9a. Architect: unknown b. Builder: unknown  
\*B10. Significance: Theme: modern architecture Area San Francisco  
Period of Significance 1948 Property Type residence Applicable Criteria C  
(Discuss importance in terms of historical or architectural context as defined by theme, period, and geographic scope. Also address integrity.)

The Navy facilities on Yerba Buena and Treasure Islands were surveyed and evaluated by JRP Historical Consulting Services in 1997. Quarters 10 was considered ineligible for National Register listing in that survey, because it was less than fifty years old and did not possess exceptional significance. However, the building is fifty years old as of 1998 and is therefore evaluated here without reference to the criteria consideration for properties less than fifty years old.

The JRP survey included information on the function and history of the Naval Station after 1945 that provides a context for evaluating post-war and cold war-era properties. Naval Station Treasure Island was transformed into a training facility after World War II, from its wartime function of supplying an armed guard for merchant marine vessels in the Pacific. Yerba Buena Island was used primarily for officers' housing in the post-war period, with substantial demolition of non-residential buildings. The Navy facilities on Yerba Buena and Treasure Islands did not play a significant role in American military history in the late 1940s or early 1950s, and Quarters 10 is not associated with significant persons or events that would make it eligible for National Register listing under Criteria A or B.

[See Continuation Sheet, Page 3 of 6.]

B11. Additional Resource Attributes: (List attributes and codes) \_\_\_\_\_

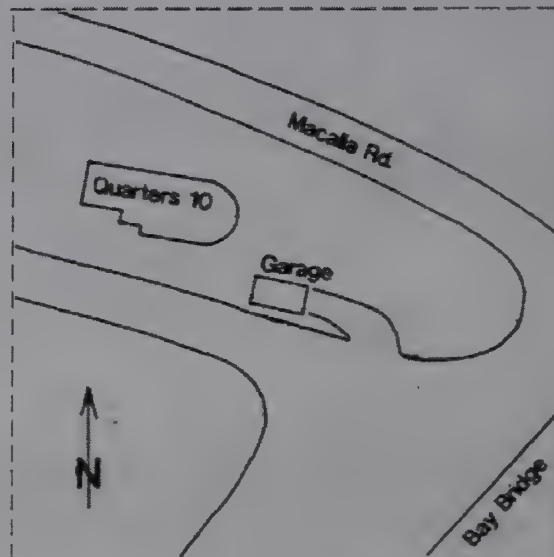
\*B12. References:

See Continuation Sheet, page 3 of 6.

B13. Remarks:

\*B14. Evaluator: Andrew Hope  
Caltrans, District 4 (Oakland)  
\*Date of Evaluation: April 1998

(This space reserved for official comments.)





State of California — The Resources Agency  
DEPARTMENT OF PARKS AND RECREATION  
**CONTINUATION SHEET**

Primary # \_\_\_\_\_  
HRI # \_\_\_\_\_  
Trinomial \_\_\_\_\_

Page 3 of 7

\*Resource Name or # (Assigned by recorder) Quarters 10, Yerba Buena Island

\*Recorded by: Andrew Hope, Caltrans, District 4 (Oakland) \*Date: April 1998 X Continuation    Update

**B10. Significance [continued from Page 2]:**

However, Quarters 10 does appear to be a significant example of mid-20th century residential architecture in the local context. The building exhibits the distinctive characteristics of the moderne and International styles, such as the flat roof, corner windows, and curved east end. The horizontal muntins of the casement windows reinforce the building's horizontal emphasis, as is typical of the moderne style, while the overhanging ends of the upper floor, supported by narrow pipe columns, display the structural daring of the International style. In addition, the wood siding and open eaves relate this building to the Bay Region style, a local expression of modernism in the mid-20th century. The clapboard siding may also have been an attempt to make this building more visually compatible with the older Quarters 1 through 7 nearby.

Navy records indicate that the house was constructed in 1948, and its presence on the site in 1958 is confirmed by aerial photographs of Yerba Buena Island taken in that year. While the house is not stylistically innovative for 1948, it is part of a design movement that remained vital in the Bay Area through the 1940s and into the 1950s. Quarters 10 is similar to a small house designed in 1936 by the prominent Bay Region style architect Gardner Dailey, which was published in 1940 in *The Modern House in America*. It also resembles a house in San Mateo County designed by San Francisco architect James Mitchell, which was published in the *Architect and Engineer* in 1941 and has a similar curved living area which takes advantage of a sloping site to provide dramatic views. (These two houses are shown on page 6.)

Quarters 10 retains a high degree of integrity, and appears to be eligible for National Register listing under Criterion C, at the local level significance. Building 267, the garage associated with Quarters 10, is contemporary with the house and is similar in design. It is therefore a contributing feature of the National Register property. As the entire military facility is owned by the Navy and there are no parcel boundaries for individual buildings, the boundary for this property would include the house and its immediate grounds, including adjacent lawn and garden areas, the garage and driveway, and the retaining wall along the north side of the property.

**B12. References [continued from Page 2]:**

*Architect and Engineer*, June 1941. (Entire issue devoted to Bay Area architects.)

*Architectural Record*, May 1949. "Is there a Bay Area Style?"

Ford, James, and Catherine Morrow Ford. *The Modern House in America*. New York: Architectural Book Publishing Co., 1940.

*Historical Study of Yerba Buena Island, Treasure Island, and their Buildings*. Prepared by the Mare Island Naval Shipyard Base Realignment and Closure (BRAC) Environmental Technical Division. March, 1996.

JRP Historical Consulting Services. *Cultural Resource Inventory and Evaluation Investigations: Yerba Buena Island and Treasure Island, Naval Station Treasure Island, San Francisco, California*. March, 1997.

Pacific Aerial Surveys, Oakland, California. Aerial photographs of Yerba Buena Island: 1947, 1958, 1963, and 1983.



State of California - The Resources Agency  
DEPARTMENT OF PARKS AND RECREATION  
CONTINUATION SHEET

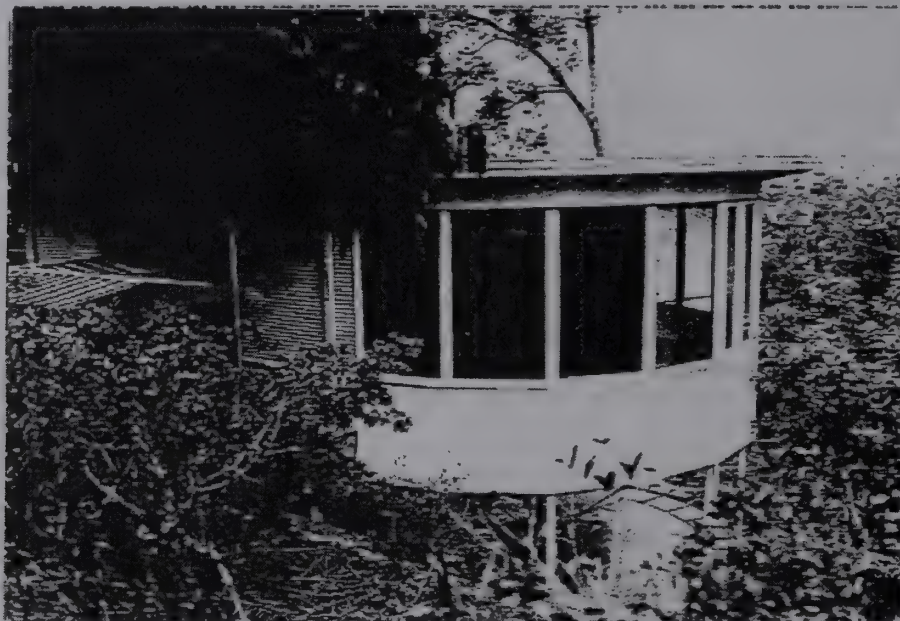
Primary # \_\_\_\_\_  
HRI # \_\_\_\_\_  
Trinomial \_\_\_\_\_

Page 4 of 7

\*Resource Name or # (Assigned by recorder) Quarters 10, Yerba Buena Island

\*Recorded by: Andrew Hope, Caltrans, District 4 (Oakland)

\*Date: April 1998 ☒ Continuation ☐ Update



View northwest, at east end of house.  
January 1998



View southwest, at east end and north facade.  
January 1998



State of California - The Resources Agency  
DEPARTMENT OF PARKS AND RECREATION  
CONTINUATION SHEET

Primary # \_\_\_\_\_  
HRI # \_\_\_\_\_  
Trinomial \_\_\_\_\_

Page 5 of 7

\*Resource Name or # (Assigned by recorder) Quarters 10, Yerba Buena Island

\*Recorded by: Andrew Hope, Caltrans, District 4 (Oakland) \*Date: April 1998 ☒ Continuation ☐ Update



View northeast, at south facade.  
January 1998



Garage, view northwest  
January 1998



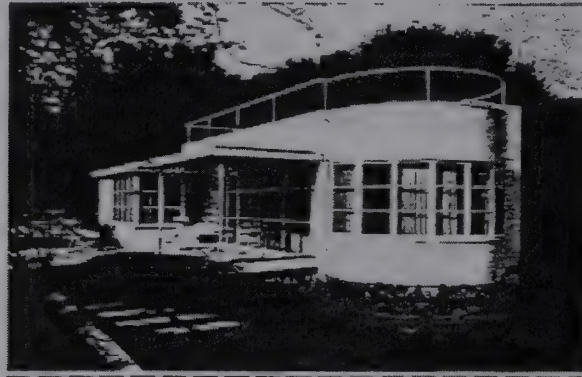
State of California – The Resources Agency  
DEPARTMENT OF PARKS AND RECREATION  
**CONTINUATION SHEET**

Primary # \_\_\_\_\_  
HRI # \_\_\_\_\_  
Trinomial \_\_\_\_\_

Page 6 of 7

\*Resource Name or # (Assigned by recorder) Quarters 10, Yerba Buena Island

\*Recorded by: Andrew Hope, Caltrans, District 4 (Oakland) \*Date: April 1998 ☒ Continuation ☐ Update



House at Woodside, California by Gardner Dailey, 1936.  
From *The Modern House in America*, p. 132.



House at Hillsborough, California by James Mitchell  
From *Architect and Engineer*, June 1941, p. 43.

State of California - The Resources Agency  
DEPARTMENT OF PARKS AND RECREATION  
**LOCATION MAP**

Primary # \_\_\_\_\_  
HRI # \_\_\_\_\_  
Trinomial \_\_\_\_\_

Page 7 of 7

\*Resource Name or # (Assigned by recorder) Quarters 10, Yerba Buena Island

\*Map Name: USGS "Oakland West" Quad \*Scale: 1 : 24,000 \*Date of Map: 1959 (rev. 1980)





State of California — The Resources Agency  
DEPARTMENT OF PARKS AND RECREATION  
**DISTRICT RECORD**

Primary # \_\_\_\_\_  
HRI# \_\_\_\_\_

Page 1 of 8

\*NRPH Status Code \_\_\_\_\_

\*Resource Name or # (Assigned by recorder) Senior Officers' Quarters Historic

District

- D1. Historic Name: Senior Officers' Quarters D2. Common Name: Senior Officers' Quarters
- D3. Detailed Description (Discuss overall coherence of the district, its setting, visual characteristics, and minor features. List all elements of district):  
The area of Yerba Buena Island where the Senior Officers' Quarters exist forms a small historic district, set apart by its location, its quality of housing, and its interrelated landscape elements. Seven Senior Officers' houses (Quarters 1-7), two garages (Buildings 83 and 205), and one residence over garage (Building 230) make up the buildings of the historic district. The area is located at the north edge of the island, toward the east end, set high on the hill with views looking north and east out to the bay. Three roads run at or near the boundaries of the district, (one of which runs in a "V" shape): Whiting Way, Northgate Road, and the second arm of Whiting Way that connects with Northgate further west and higher on the hill, altogether making a roughly triangular district. (See continuation sheet.)
- D4. Boundary Description (Describe limits of district and attach map showing boundary and district elements):  
The boundary lines of the roughly triangular Senior Officers' Historic District are drawn by Northgate Road on the west side, the lower edge of the greensward on the east side, and a third line up the hill from the inner "V" of Whiting Way on the south side, to encompass the formal gardens between Quarts 1 and Building 230. Whiting Way runs approximately south to north, with Quarters 1 through 5 located on the west side. Northgate Road runs approximately east to west, with Quarters 6 and 7 located on the south side. The second arm of Whiting Way runs approximately northwest to southeast, with Buildings 205 and 83 on the northeast side, and Building 230 on the southwest side. The outside perimeter of the boundaries immediately surrounds the buildings at the west and south sides, and surrounds the lower edge of the greensward on the east side. The housing area is tied together at the center by a terraced park, along with one interior road running behind Quarters 2 through 7. The boundaries of the historic district are shown in the attached sketch map.
- D5. Boundary Justification:  
Boundaries were determined to include the historic buildings of the area, and the landscape elements that tie them together. Each of the buildings is an important contributor to the district. Quarters 1 through 7, lining the east lawn area and north boundary, are the large and significant Officers' Quarters. Buildings 205, 83, and 230, which line the southwestern boundary behind the quarters, are the garages and family quarters. The southern boundary also runs through two landscaped terraced park areas. All of the buildings retain a high degree of integrity, with virtually no alterations since the historic period. The landscape that connects the buildings has also been retained in a design appropriate to the historic district.
- D6. Significance: Theme U.S. Naval Training Station Area Yerba Buena Island  
Period of Significance - 1900-1947 Applicable Criteria A, C  
(Discuss district's importance in terms of historical or context as defined by theme, period, and geographic scope. Also address integrity.)  
The Senior Officers' Quarters Historic District at Yerba Buena Island appears to qualify for listing in the National Register of Historic Places under Criteria A and C, in the areas of military history and architecture. The boundaries of this historic district are shown in Figure 1. Contributing buildings include Quarters 1, 2, 3, 4, 5, 6, and 7, as well as three associated garages, Buildings 83, 205, and 230. The period of significance extends from 1900 to 1947; the former represents the oldest date of construction at the site, the latter an arbitrary 50 year cut-off, to account for the fact that the district does not appear to be exceptionally significant. The historic district is eligible at the local level of significance. (See continuation sheet.)
- D7. References:  
Mare Island Naval Shipyard, BRAC Environmental Division, "Historical Study of Yerba Buena Island, Treasure Island, 1995.
- D8. Evaluator: Stephen D. Mikesell  
Date of Evaluation: January 1997



CONTINUATION SHEET

Page 2 of 8

\*NRPH Status Code \_\_\_\_\_

\*Resource Name or # (Assigned by recorder) Senior Officers' Quarters Historic District

DESCRIPTION (continued)

The main road that runs near the east boundary, separating the group of Quarters 1-4 and the greensward that sweeps down the hill in front of them, is Whiting Way. Quarters 5 faces out onto the juncture between Whiting Way and Northgate Road, where Quarters 6 and 7 continue along the outside curve of the district boundary, with views north to Treasure Island and the bay. Quarters 6 and 7, however, are accessible only from the rear inner road, known as Garden Way, behind the houses. The third road, a second arm of Whiting Way, runs alongside the southwestern boundary of the district, with garages (Buildings 205 and 83) on the east side, and the residence over garage (Building 230) on the west side.

Landscape elements that tie the district together are both formal and informal. The setting of the district on the hill places the buildings in an area that is bounded by steep hillsides at the south and west edges, and steep downward slopes at the north and east edges. Quarters 1 is located at the innermost point where the roads meet. It fronts the road directly and is immediately surrounded by boxed hedges. The front hedges are shown in **Photograph 1**, facing out onto a sweeping greensward. The front road continues north, while a walkway splits off just uphill from the road, leading up to Quarters 2 through 4, as shown in **Photograph 2**. Grass lawn is planted between the walkway and street, but ends at Quarters 5 where earth cover begins and Eucalyptus trees grow informally on the steep slope in front of the house, as shown in **Photograph 3**. Quarters 5 has its own individual walkway coming up from the street. Quarters 6 and 7 continue along the same slope of informal Eucalyptus trees but are accessible only from the inside road (Garden Way).

Whiting Way takes off of Northgate Road, leading south to Quarters 1, past Building 205 and 83 (the garages) on the left, and Building 230 (the residence over garage) on the right. Building 230 has its own semi-formal enclosed yard surrounding it. The two most formal community type gardens that tie the district together are the terraced gardens that exist at the outside boundary between Building 230 and Quarters 1, and at the interior park space, central to the district, behind the quarters on the north and east sides and behind the garages on the west side. The garden at the western boundary, shown in **Photograph 4**, is bounded by boxed hedges at the street, with a grass lawn, pathways and trees, and brick walls with terraced gardens cut back into the hillside. The garden at the center of the district, shown in **Photograph 5**, is bounded by random cut stone retaining walls at street level, with walls at terrace levels, and grass, trees, tables and benches.

SIGNIFICANCE (continued)

In 1898, the U.S. Navy built a Naval Training Station at Yerba Buena Island. At the time it was built, the Yerba Buena Naval Training Station was one of four such facilities in the United States and the only one on the West Coast.<sup>1</sup> The Training Station was a key facility for the Navy on the West Coast, ultimately too important to be housed on the limited usable land at Yerba Buena Island; the training facility would be moved to San Diego in 1923, representing a large step in the transfer of major Navy installations from northern California to San Diego.

<sup>1</sup> Mare Island Naval Shipyard, BRAC Environmental Division, "Historical Study of Yerba Buena Island, Treasure Island, 1995, p. 1-14. Hereafter cited as Mare Island 1995.

CONTINUATION SHEET

Page 3 of 8

\*NRPH Status Code \_\_\_\_\_

\*Resource Name or # (Assigned by recorder) Senior Officers' Quarters Historic District

The Training Station property used all of Yerba Buena Island to some extent but was centered on relatively flat lands at the East Cove. The functional core of the Training Station was bounded by East Point (a hill at the eastern end of the island, now hidden beneath the Bay Bridge) on the east; East Cove on the south (Army Point is now used by the Coast Guard); San Francisco Bay on the north (now the harbor between Yerba Buena and Treasure islands); and on the west by the central hillside of Yerba Buena (denoted today by the east portal to the Yerba Buena Tunnel). While some buildings existed on the hilltop and the west side of the island, the key facilities of the Station were in this small geographical area.

The key facility of the Station was a large barracks, capable of housing 500 men, with a very large drill hall. This building was completed in early 1900. It measured 300' x 600' and was located on the flat land at the east end of the island, adjacent to extant tennis courts, just east of and downhill from the officers' quarters (Buildings 1-7). This building would remain in place until it was demolished in 1960.

While the barracks were under construction, the Navy began building a series of Senior Officers' Quarters, just uphill from the barracks. The Commander's Quarters, Building 1, was completed in 1900; the seven other Senior Officers' Quarters (Buildings 2-8), were completed between 1901 and 1905. All eight of these buildings still exist and are in use. Buildings 1 through 7 are clustered in a neat neighborhood on the north side of the Bay Bridge. Quarters 8, on the south side of the Bay Bridge, is now isolated from the others; it is geographically more closely related to the Coast Guard housing complex than to the remainder of the 1901-1905 officers' quarters.

Although original plans have not been located, it is presumed that Quarters 1-7 were designed by the Bureau of Yards and Docks, the design and construction arm of the Navy. The buildings are quite similar in style to the Senior Officers' Quarters at the Mare Island Naval Shipyard; the quarters at Mare Island were under construction at about the same time as Quarters 1-7 at Yerba Buena Island. The Senior Officers' Quarters at Mare Island were designed by the Bureau of Yards and Docks, with no assistance from private architects. [Quarters 8, by contrast, was designed by the Reid Brothers, a well-known San Francisco architectural firm. Quarters 8 was part of the Marine camp at Yerba Buena Island. It and the Marine barracks were both privately-designed.]

The Training Station was active at the site between 1900 and 1923. Typically, between four and five hundred trainees were present at the station at any given time. Training included six months shore training, followed by six months at sea on training ships. As a busy facility, the only such basic training operation on the West Coast, the training station required a great deal of building activity. Dozens of buildings were constructed there between 1900 and 1923, the majority of which have since been demolished. Twenty-seven buildings remain from this period.

The small island was perennially overcrowded, causing the Navy to look elsewhere for a major West Coast Training Station. The preparedness build up prior to American entry into World War I so overtaxed the Yerba Buena facility -- 13,000 men were assigned there at one time -- that the Navy established a second California Training Station in San Diego, beginning in 1917. After the war, the Navy elected to expand the San Diego facility and close the training station at Yerba Buena Island. The last of the Training Station personnel were relocated to San Diego in 1923 and the Yerba Buena facility decommissioned. The island did remain a Navy facility, however, for a more limited "receiving ship" function: a "receiving ship" was a transient station for sailors awaiting assignment to duty on ships at sea. It appears that relatively few men were stationed at the facility in association with this function; those that were stationed there re-occupied the barracks and re-used the other buildings that had been built for the Training Station.<sup>2</sup>

<sup>2</sup> Mare Island, 1995, p. 1-39.



CONTINUATION SHEET

Page 4 of 8

\*NRPH Status Code \_\_\_\_\_

\*Resource Name or # (Assigned by recorder) Senior Officers' Quarters Historic District

Yerba Buena Island was also used as a Receiving Ship facility during World War II, giving the area a continued use for the old Training Station buildings. At the end of World War II, the entire Yerba Buena Island-Treasure Island Naval Station was severely downsized and given training functions, unrelated to any previous uses there. This functional re-orientation had the most profound impact on Yerba Buena Island, which was transformed into an Officers' housing compound to serve the training center of Treasure Island. As a result, virtually all non-residential buildings were either demolished or converted for residential uses.

The effect of this re-orientation was destruction of most traces of the once-busy Naval Training Station. There are 23 buildings and structures on Yerba Buena Island that were built between 1900 and 1923. Eight of these are included within this historic district (Quarters 1-7 and Building 83). The remaining 15 buildings and structures are scattered throughout the island, including two oil tanks, two water tanks, six heavily modified duplexes, a power house, a converted barracks building, and a small storage building. There is also an eighth Senior Officer's Quarters (Building 8), which is eligible for listing in the National Register individually but is too distant physically to be included within this historic district.

Of the scant remains from the Naval Training Station, only this historic district and Quarters 8 reflect their appearance at the time the Naval Station operated. (Quarters 8 is discussed separately.) The historic district is best representative of the architecture of the time because it retains integrity, not only of the individual buildings, but of the streetscape and the general ambiance of the housing compound.



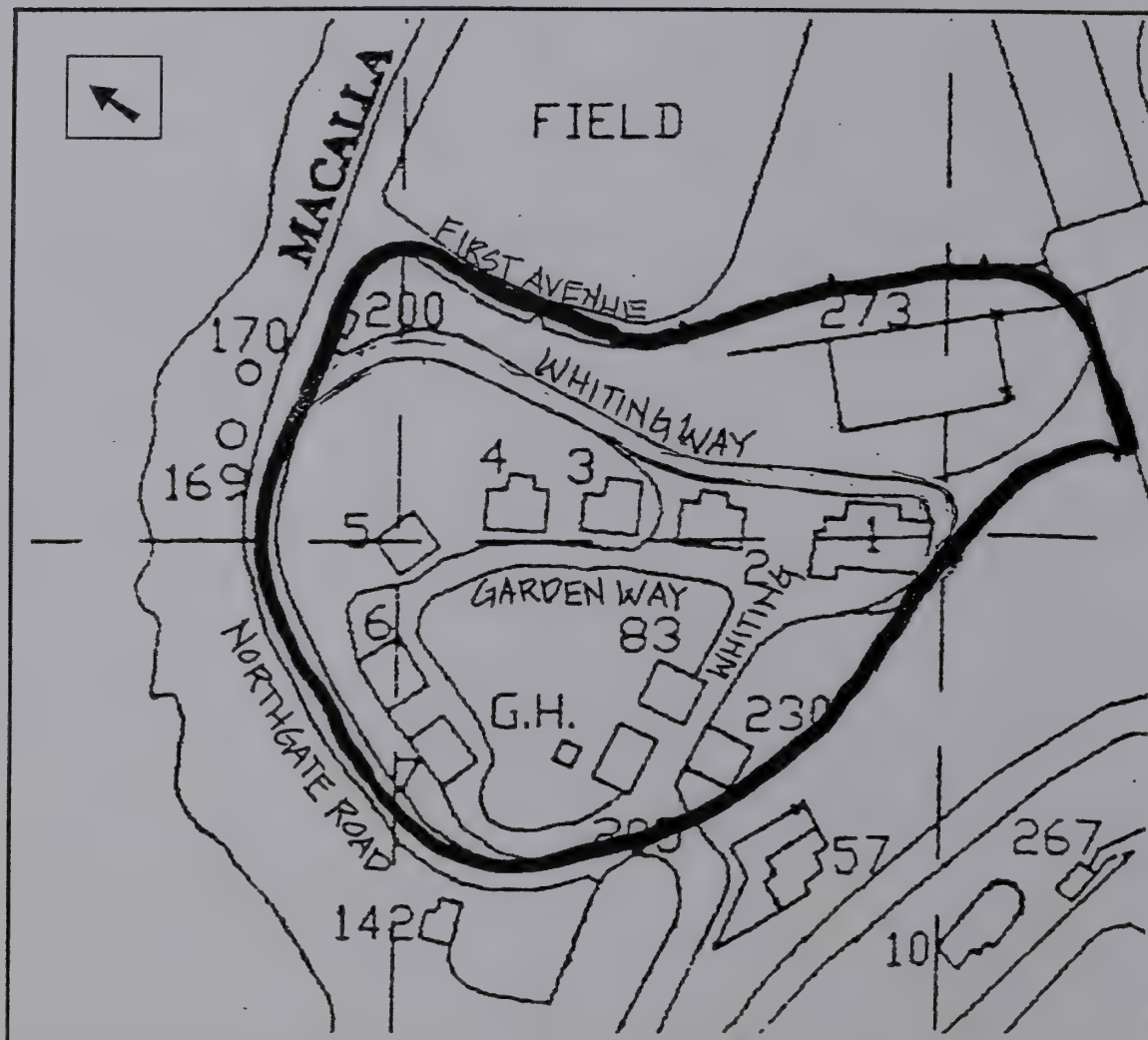


Figure 1. Senior Officers' Quarters Historic District, boundaries.

CONTINUATION SHEET

Primary # \_\_\_\_\_  
HRI# \_\_\_\_\_

Page 6 of 8

\*NRPH Status Code \_\_\_\_\_

\*Resource Name or # (Assigned by recorder) Senior Officers' Quarters Historic District



Photo 1. Boxed hedges at greensward in front of Quarters 1, camera facing south.

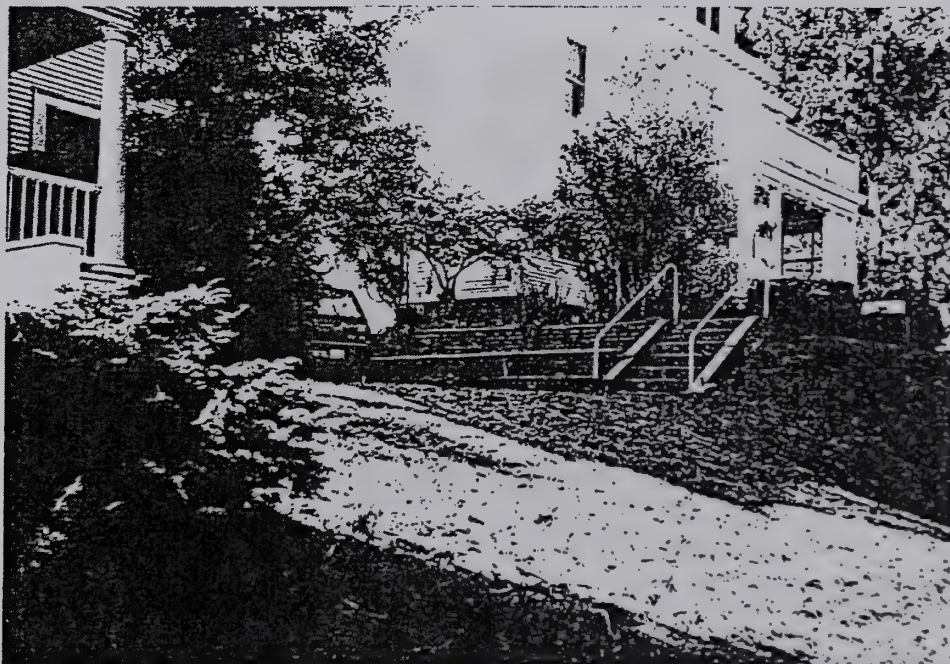


Photo 2. Walkway between Quarters 3 and 4, camera facing north.



Page 7 of 8

\*NRPH Status Code \_\_\_\_\_

\*Resource Name or # (Assigned by recorder) Senior Officers' Quarters Historic District



Photo 3. Informal Eucalyptus trees on slope between Quarters 4 and 5.

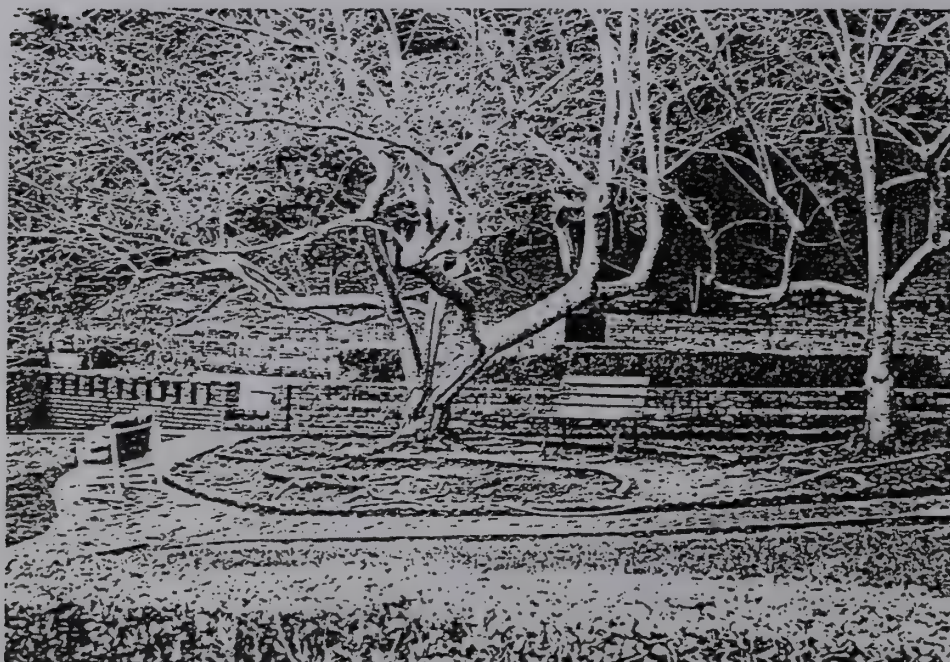


Photo 4. Terraced garden at western edge of boundary, between Quarters 1 and Building 230. camera facing west.



CONTINUATION SHEET

Page 8 of 8

\*NRPH Status Code \_\_\_\_\_

\*Resource Name or # (Assigned by recorder) Senior Officers' Quarters Historic District

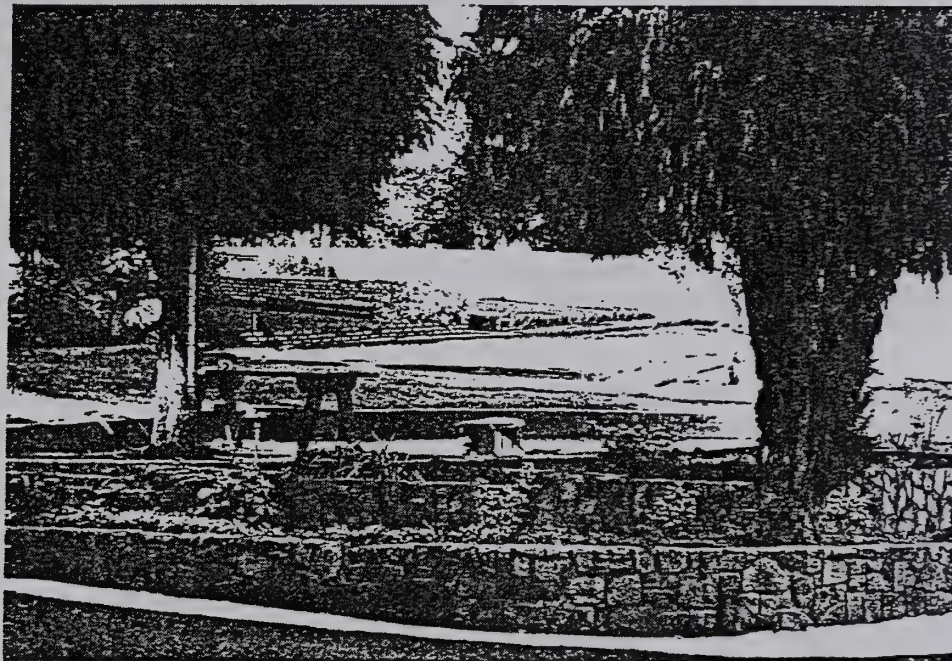


Photo 5. Central terraced garden behind Quarters 2-7, camera facing northeast.

PRIMARY RECORD

Primary # \_\_\_\_\_

HRI # \_\_\_\_\_

Trinomial \_\_\_\_\_

NRHP Status Code \_\_\_\_\_

Other Listings \_\_\_\_\_

Review Code \_\_\_\_\_ Reviewer \_\_\_\_\_ Date \_\_\_\_\_

Page 1 of 3

\*Resource Name or #: (Assigned by recorder) Quarters 1

P1. Other Identifier: "Nimitz Quarters" -- Flag Officer's Quarters

\*P2. Location: ☐ Not for Publication ☒ Unrestricted \*a. County San Francisco  
and P2c, P2e, and P2b or P2d. (Attach Location Map as necessary.)

\*b. USGS 7.5' Quad Oakland West Date 1980 T   ; R   :    ¼ of    ¼ of Sec   ;    B.M.

c. Address Naval Station, Treasure Island City San Francisco Zip 94592-5100

d. UTM: (Give more than one for large and/or linear resources) Zone:   ;    mE/    mN

\*e. Other Locational Data: (E.g., parcel #, directions to resource, elevation, etc., as appropriate.)

\*P3a. Description: (Describe resource and its major elements. Include design, materials, condition, alterations, size, setting, and boundaries.)

Quarters 1, known as "Nimitz House" is the largest and most detailed of the Officers' Quarters, distinguishing it from the other quarters in the small surrounding district. It is also set apart by its location and surroundings, placed on the hillside at the southern edge of the district, facing east toward the bay. A greensward sweeps down the hill in front of the house, and formal gardens are built into the hillside behind the house. The house is prominent, with 5886 square feet, designed in the Classical Revival style. (See continuation sheet.)

\*P3b. Resource Attributes: (See attributes and codes) HP34 Military Property; HP2 Single Family Property

\*P4. Resources Present: ☒ Building ☐ Structure ☐ Object ☐ Site ☐ District ☒ Element of District ☐ Other (Isolates, etc.)

P5a. Photo or Drawing (Photo required for buildings, structures, and objects.)



P5b. Description of Photo:

(View, date, accession #)

East facade, camera facing  
southwest.

\*P6. Date Constructed / Age and

Sources: ☒ Historic

☐ Prehistoric ☐ Both

1900

\*P7. Owner and Address:

Naval Station

Treasure Island

San Francisco, CA 94130

\*P8. Recorded by: (Name, affiliation,  
and address)

Janice Calpo

JRP Historical Consulting

1477 Drew Ave., Suite 105

Davis, CA 95616

\*P9. Date Recorded: 12/23/96

\*P10. Survey Type: (Describe)

Intensive

\*P11. Report Citation: (Cite Survey report and other sources, or enter "none.") Historical Study of Yerba Buena Island,

Treasure Island, and Their Buildings \*Attachments: ☒ Location Map ☒ Sketch Map ☒ Continuation Sheet ☒ Building,  
Structure, and Object Record ☐ Linear Resource Record ☐ Archaeological Record ☐ District Record ☐ Milling Station Record  
☐ Rock Art Record ☐ Artifact Record ☐ Photograph Record ☐ Other (List) \_\_\_\_\_



**BUILDING, STRUCTURE, AND OBJECT RECORD**

Primary # \_\_\_\_\_  
HRI# \_\_\_\_\_

Page 2 of 3

\*NRPH Status Code \_\_\_\_\_

\*Resource Name or # (Assigned by recorder) Quarters 1

- B1. Historic Name: Naval Station Commander's Quarters  
 B2. Common Name: Quarters 1: "Nimitz Quarters" -- Flag Officer's Quarters  
 B3. Original Use: Naval Station Commander's quarters B4. Present Use: Flag Officer's quarters  
 \*B5. Architectural Style: Classical Revival  
 \*B6. Construction History: (Construction date, alterations, and date of alternations.)  
 Built 1900. 1900-1945 -- Naval Station Commander's quarters. 1945-present -- Flag Officer's quarters. Notes:  
 Heavily damaged by fire in 1934. The first two floors were rebuilt in 1935. The third floor was not repaired and  
 was sealed off to prevent reuse.

- B7. Moved? ☒ No ☐ Yes ☐ Unknown Date: \_\_\_\_\_ Original Location: \_\_\_\_\_  
 \*B8. Related Features:  
 Senior Officers' Quarters Historic District; greensward at front; terraced gardens at back.

- B9a. Architect: Bureau of Yards and Docks B9b. Builder: Bureau of Yards and Docks  
 \*B10. Significance: Theme Naval Training Station Area Yerba Buena Island, San Francisco  
 Period of Significance 1900-1947 Property Type Building Applicable Criteria A, C  
 (Discuss importance in terms of historical or architectural context as defined by theme, period, and geographic scope. Also address integrity.)

Quarters 1 has been listed in the National Register of Historic Places under Criterion A for its association with the period in which Yerba Buena Island was established as one of only four Naval Training Stations in the United States, and as the only Naval Training Station on the West Coast. Quarters 1 is also listed in the National Register under Criterion C for its architecture, having integrity of design, workmanship, feeling and association. The building retains a high degree of integrity, even though fire damage repairs in 1934 made some modifications. Not only does the building qualify for listing individually, but also as an important contributor to the 10 buildings of the Senior Officers' Quarters Historic District. (See continuation sheet.)

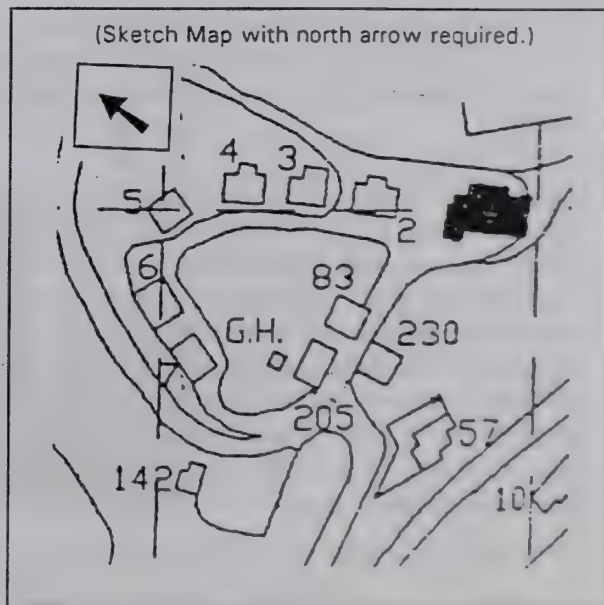
- B11. Additional Resource Attributes: (List attributes and codes): HP34 Military Property

- \*B12. References: Historical Study of Yerba Buena Island, Treasure Island, and Their Buildings, prepared by Mare Island Naval Shipyard Base Realignment and Closure  
 (BRAC)

B13. Remarks:

- \*B14. Evaluator: Stephen D. Mikesell  
 \*Date of Evaluation: January 1997

(This space reserved for official comments.)



\*Required Information



Page 3 of 3

\*NRPH Status Code \_\_\_\_\_

\*Resource Name or # (Assigned by recorder) Quarters I

**DESCRIPTION (continued)**

The two story wood frame house is built on a brick foundation and clad in weatherboard siding. Windows of the house are predominantly 1/1 double-hung wooden sash. Some 6/6 windows are found on the rear wing. Sidelights and a segmental arched transom are found at the front door entrance. Its form takes shape with a large central rectangular element, flanked at each side by smaller wings, and by additive elements at the rear. The main central element has a hipped ridged roof with three small hipped dormers at the front center. Each dormer has a four-pane pivotal window. Wings extend from the two sides of the building, with the front of each wing set back from the front of the main building, but flush with the rear walls of the main building. The wings have two stories, capped by parapeted gable-roofs inserted into the main hip-roof on the back sides. A solarium with multiple square lights fills each of the front corners between the main building element and each wing; a two story solarium on the southwest wing and a one story solarium on the northeast wing.

A full front porch lines the main element, with a perpendicular canopied walkway at the front, and walkways at each side of the porch. The railing is a simple low brick wall. A flat roof with molded cornice detailing covers the front. Pairs of fluted Doric columns with scrolled brackets support the cornice, with one squared paneled column is at each corner. Dentils and spheres are found in the detailing above the columns. The same types of columns in pilaster relief are found on the solariums and in other details of the building.

The rear of the building has some additional projecting elements. The left (north) end of the rear has the largest element with a hipped wing and shed extension off of that wing. A two story angled bay is at the center of the rear. At the right (south) end is a boxed bay projecting from the second story and supported by a square post with angled braces.

Alterations to the house have been minimal, all occurring before 1946 and therefore associated with the historic period. In 1934, the upper floor was damaged by fire, but rebuilt the same except for the central dormer, which was originally larger but rebuilt to match the other two dormers. Other minor alterations that occurred before 1946 include closing in of the ground floor porches on the wings and the addition of the solarium on the upper level of the southwest wing.

**SIGNIFICANCE (continued)**

Quarters I came to be known as "Nimitz House" for 5-star Admiral Chester Nimitz who was permitted to use the Quarters as his residence from the end World War II until he died. Admiral Nimitz did not, however, reside at the house during its period of significance; for that reason, the building does not qualify for the National Register for its association with Admiral Nimitz.

Quarters I was built in 1900, as part of the initial wave of building construction that established the Naval Training Station as an active base between 1900 and 1923. The second wave of construction came between 1914 and 1918 in a preparedness effort for American entry into World War I. At its peak in 1917, 13,000 men were assigned to the island. Dozens of buildings were constructed during this period, the majority of which have since been demolished as building requirements have changed with changing uses of the island since World War I. Twenty-three buildings currently remain from the period of the island as a Naval Training Station, making the 10 buildings of this district a more rare representation. Eight unmodified Senior Officers' Quarters remain on the island -- including Quarters 8 that exists outside the district -- and are especially important to the history of Yerba Buena Island because they represent all of the major unmodified buildings on the island dating to its use as a Naval Training Station. Quarters 1-7 are notable because they retain not only their individual integrity but their integrity as a group as well.

\*Required Information

State of California — The Resources Agency  
DEPARTMENT OF PARKS AND RECREATION

PRIMARY RECORD

Primary # \_\_\_\_\_

HRI # \_\_\_\_\_

Trinomial \_\_\_\_\_

NRHP Status Code \_\_\_\_\_

Other Listings \_\_\_\_\_

Review Code \_\_\_\_\_ Reviewer \_\_\_\_\_ Date \_\_\_\_\_

Page 1 of 3

\*Resource Name or #: (Assigned by recorder) Quarters 2

P1. Other Identifier: Senior Officers' Quarters

\*P2. Location: ☐ Not for Publication ☒ Unrestricted \*a. County San Francisco  
and P2c, P2e, and P2b or P2d. (Attach Location Map as necessary.)

\*b. USGS 7.5' Quad Oakland West Date 1980 T \_\_\_\_\_ R \_\_\_\_\_ : \_\_\_\_\_ ¼ of \_\_\_\_\_ ¼ of Sec \_\_\_\_\_ ; \_\_\_\_\_ B.M.

c. Address Naval Station, Treasure Island City San Francisco Zip 94592-5100

d. UTM: (Give more than one for large and/or linear resources) Zone: \_\_\_\_\_ ; \_\_\_\_\_ mE / \_\_\_\_\_ mN

\*e. Other Locational Data: (E.g., parcel #, directions to resource, elevation, etc., as appropriate.)

\*P3a. Description: (Describe resource and its major elements. Include design, materials, condition, alterations, size, setting, and boundaries.)

Quarters 2 is a residence that was built in 1900 as Officers' Quarters. It is built upon a brick foundation, set high on the hill among a small district of Officers' Quarters. Quarters 2 faces east, across a small park area and out toward the east bay. The general form of the building is that of the two story American four-square, with embellishments to distinguish it as Officers' Quarters and to correlate it with the neighboring quarters. A ridged hipped roof with boxed eaves tops the rectangular building. (See continuation sheet.)

\*P3b. Resource Attributes: (See attributes and codes) HP34 Military Property; HP2 Single Family Property

\*P4. Resources Present: ☒ Building ☐ Structure ☐ Object ☐ Site ☐ District ☒ Element of District ☐ Other (Isolates, etc.)

P5a. Photo or Drawing (Photo required for buildings, structures, and objects.)



P5b. Description of Photo:

(View, date, accession #) \_\_\_\_\_

East facade, camera facing

northwest.

\*P6. Date Constructed / Age and

Sources: ☒ Historic

☐ Prehistoric ☐ Both

1900

\*P7. Owner and Address:

Naval Station

Treasure Island

San Francisco, CA 94130

\*P8. Recorded by: (Name, affiliation,  
and address)

Janice Calpo

JRP Historical Consulting

1477 Drew Ave., Suite 105

Davis, CA 95616

\*P9. Date Recorded: 12/23/96

\*P10. Survey Type: (Describe)

Intensive

\*P11. Report Citation: (Cite Survey report and other sources, or enter "none.") Historical Study of Yerba Buena Island,  
Treasure Island, and Their Buildings

\*Attachments: ☐ Location Map ☒ Sketch Map ☒ Continuation Sheet  
☒ Building, Structure, and Object Record ☐ Linear Resource Record ☐ Archaeological Record ☐ District Record ☐ Mining  
Station Record ☐ Rock Art Record ☐ Artifact Record ☐ Photograph Record ☐ Other (List) \_\_\_\_\_



**BUILDING, STRUCTURE, AND OBJECT RECORD**

Primary # \_\_\_\_\_

HRI# \_\_\_\_\_

Page 2 of 3

\*NRPH Status Code \_\_\_\_\_

\*Resource Name or # (Assigned by recorder) Quarters 2

- B1. Historic Name: Senior Officers' Quarters  
 B2. Common Name: Quarters 2, Senior Officers' Quarters  
 B3. Original Use: Senior Officers' quarters B4. Present Use: Senior Officers' quarters  
 \*B5. Architectural Style: Classical Revival  
 \*B6. Construction History: (Construction date, alterations, and date of alternations.)  
Built 1900.

- B7. Moved? ☒ No ☐ Yes ☐ Unknown Date: \_\_\_\_\_ Original Location: \_\_\_\_\_  
 \*B8. Related Features:  
Senior Officers' Quarters Historic District

- B9a. Architect: Bureau of Yards and Docks B9b. Builder: Bureau of Yards and Docks  
 \*B10. Significance: Theme Naval Training Station Area Yerba Buena Island, San Francisco  
 Period of Significance 1900-1947 Property Type Building Applicable Criteria A,C  
 (Discuss importance in terms of historical or architectural context as defined by theme, period, and geographic scope. Also address integrity.)

Quarters 2, as a contributing element of the Senior Officers' Quarters Historic District, appears to qualify for listing in the National Register of Historic Places at the local level of significance. The district is significant for its association with the period in which Yerba Buena Island was established as one of only four Naval Training Stations in the United States, and as the only Naval Training Station on the West Coast, thereby meeting National Register Criterion A. The building also appears to qualify for listing under Criterion C, for its architecture, having integrity of design, workmanship, feeling and association. The building retains a high degree of individual integrity as well as integrity as part of the historic district. (See continuation sheet.)

- B11. Additional Resource Attributes: (List attributes and codes): HP34 Military Property

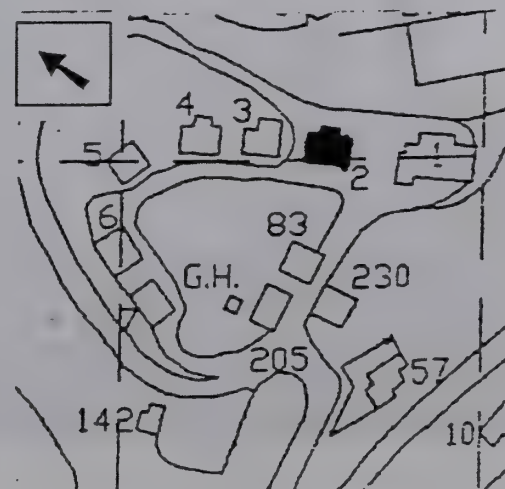
- \*B12. References: Historical Study of Yerba Buena Island, Treasure Island, and Their Buildings, prepared by Mare Island Naval Shipyard Base Realignment and Closure  
 (BRAC)

- B13. Remarks:

- \*B14. Evaluator: Stephen D. Mikesell  
 \*Date of Evaluation: January 1997

(This space reserved for official comments.)

(Sketch Map with north arrow required.)



\*Required Information



Page 3 of 3

\*NRPH Status Code \_\_\_\_\_

\*Resource Name or # (Assigned by recorder) Quarters 2

**DESCRIPTION (continued)**

A large gable dormer dominates the front of the house, rising to a ridge height above the main roof. A smaller truncated gable dormer exists at the back of the house. Additional small shed dormers exist on the front. The generally rectangular shape of the house is interrupted at the front where at second story level, the wall and the dormer above it protrude forward. Double doors open from that section out onto a balcony which is created by the cover of the main entry porch below. A balustrade of simple posts and flat railing surrounds the balcony. The lower porch is enhanced with slightly more detailing, having a molded porch railing, a molded cornice with a plain frieze, and squared columns. Concrete steps with a solid brick railing lead up to the front porch.

Narrow two-part lapped siding sheathes the house. Windows are predominantly double hung sash, with most windows having a leaded glass design in the upper sash. The glass design is in the form of narrow vertical panels, with diamond shapes at the top and bottom. Other windows include sidelights at the front door, an Italianate bay window with brackets at the rear, a casement window with fanlight at the rear, and windows in the dormers. Additional detailing can be found in the upper story soffit, with a block pattern where every other block contains a series of small spheres. Pilasters are found on the main front dormer, in a simple rectangular relief with the same sphere pattern at the top representing capitals.

A large, two-story fireplace lines each of the two side walls of the house. One appears to be sunken into the wall and the other stands beside the wall. A pattern of sunken bricks with crenellations at the top is found just below the neck of the fireplace.

**SIGNIFICANCE (continued)**

Quarters 2 was built in 1900, as part of the initial wave of building construction that established the Naval Training Station as an active base between 1900 and 1923. The second wave of construction came between 1914 and 1918 in a preparedness effort for American entry into World War I. At its peak in 1917, 13,000 men were assigned to the island. Dozens of buildings were constructed during this period, the majority of which have since been demolished with changing military requirements since World War I. Twenty-three buildings currently remain from the period of the island as a Naval Training Station, making the 10 buildings of this district a more rare representation. Eight unmodified Senior Officers' Quarters remain-- including Quarters 8 that exists outside the district -- and are especially important to the history of Yerba Buena Island because they represent all of the major unmodified buildings on the island dating to its use as a Naval Training Station. Quarters 1-7 are notable because they retain not only their individual integrity but also their integrity as a group.

PRIMARY RECORD

Primary # \_\_\_\_\_

HRI # \_\_\_\_\_

Trinomial \_\_\_\_\_

NRHP Status Code \_\_\_\_\_

Other Listings \_\_\_\_\_

Review Code \_\_\_\_\_ Reviewer \_\_\_\_\_ Date \_\_\_\_\_

Page 1 of 3

\*Resource Name or #: (Assigned by recorder) Quarters 3

P1. Other Identifier: Officers' Quarters

\*P2. Location: ☐ Not for Publication ☒ Unrestricted \*a. County San Francisco  
and P2c, P2e, and P2b or P2d. (Attach Location Map as necessary.)

\*b. USGS 7.5' Quad Oakland West Date 1980 T   ; R   :    ¼ of    ¼ of Sec   ;    B.M.

c. Address Naval Station, Treasure Island City San Francisco Zip 94592-5100

d. UTM: (Give more than one for large and/or linear resources) Zone:   ;    mE/    mN

\*e. Other Locational Data: (E.g., parcel #, directions to resource, elevation, etc., as appropriate.)

\*P3a. Description: (Describe resource and its major elements. Include design, materials, condition, alterations, size, setting, and boundaries.)

Quarters 3 is a residence that was built in 1901 as Officers' Quarters. It is built upon a brick foundation, set high on the hill among a small district of Officers' Quarters. Quarters 3 faces east, across a small park area and out toward the east bay. The general form of the building is that of the two story American four-square, with embellishments to distinguish it as Officers' Quarters and to correlate it with the neighboring quarters. (See continuation sheet.)

\*P3b. Resource Attributes: (See attributes and codes) HP34 Military Property: HP2 Single Family Property

\*P4. Resources Present: ☒ Building ☐ Structure ☐ Object ☐ Site ☐ District ☒ Element of District ☐ Other (Isolates, etc.)

P5a. Photo or Drawing (Photo required for buildings, structures, and objects.)



P5b. Description of Photo:

(View, date, accession #) \_\_\_\_\_

East facade, camera facing  
northwest.

\*P6. Date Constructed / Age and

Sources: ☒ Historic

☐ Prehistoric ☐ Both

1901

\*P7. Owner and Address:

Naval Station

Treasure Island

San Francisco, CA 94130

\*P8. Recorded by: (Name,  
affiliation, and address)

Janice Calpo

JRP Historical Consulting

1477 Drew Ave., Suite 105

Davis, CA 95616

\*P9. Date Recorded: 12/23/96

\*P10. Survey Type: (Describe)

Intensive

\*P11. Report Citation: (Cite Survey report and other sources, or enter "none.") Historical Study of Yerba Buena Island,

Treasure Island, and Their Buildings

\*Attachments: ☐ Location Map ☒ Sketch Map ☒ Continuation Sheet  
☒ Building, Structure, and Object Record ☐ Linear Resource Record ☐ Archaeological Record ☐ District Record ☐ Milling  
Station Record ☐ Rock Art Record ☐ Artifact Record ☐ Photograph Record ☐ Other (List) \_\_\_\_\_



**BUILDING, STRUCTURE, AND OBJECT RECORD**

Page 2 of 3

\*NRPH Status Code \_\_\_\_\_

\*Resource Name or # (Assigned by recorder) Quarters 3

- B1. Historic Name: Officers' Quarters  
B2. Common Name: Quarters 3. Officers' Quarters  
B3. Original Use: Officers' quarters B4. Present Use: Officers' quarters  
\*B5. Architectural Style: Classical Revival  
\*B6. Construction History: (Construction date, alterations, and date of alternations.)  
Built 1901.

- B7. Moved? ☒ No ☐ Yes ☐ Unknown Date: \_\_\_\_\_ Original Location: \_\_\_\_\_  
\*B8. Related Features:  
Senior Officers' Quarters Historic District

- B9a. Architect: Bureau of Yards and Docks B9b. Builder: Bureau of Yards and Docks  
\*B10. Significance: Theme Naval Training Station Area Yerba Buena Island, San Francisco  
Period of Significance 1901-1947 Property Type Building Applicable Criteria A,C  
(Discuss importance in terms of historical or architectural context as defined by theme, period, and geographic scope. Also address integrity.)

Quarters 3, as a contributing element of the Senior Officers' Quarters Historic District, appears to qualify for listing in the National Register of Historic Places at the local level of significance. The district is significant for its association with the period in which Yerba Buena Island was established as one of only four Naval Training Stations in the United States, and as the only Naval Training Station on the West Coast, thereby meeting National Register Criterion A. The building also appears to qualify for listing under Criterion C, for its architecture, having integrity of design, workmanship, feeling and association. The building retains a high degree of individual integrity as well as integrity as part of the historic district. (See continuation sheet.)

- B11. Additional Resource Attributes: (List attributes and codes): HP34 Military Property

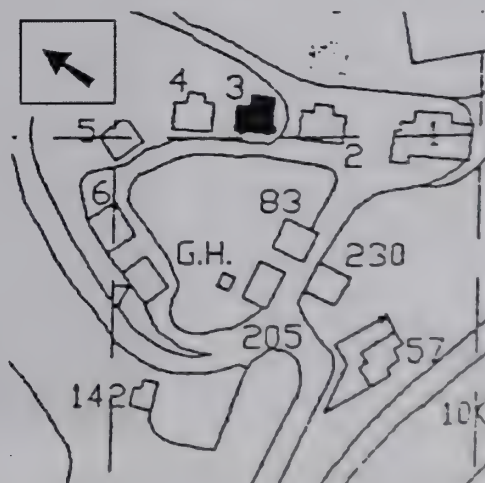
- \*B12. References: Historical Study of Yerba Buena Island, Treasure Island, and Their Buildings, prepared by Mare Island Naval Shipyard Base Realignment and Closure (BRAC)

B13. Remarks:

- \*B14. Evaluator: Stephen D. Mikesell  
\*Date of Evaluation: January 1997

(This space reserved for official comments.)

(Sketch Map with north arrow required.)



\*Required Information



CONTINUATION SHEET

Primary # \_\_\_\_\_  
HRI# \_\_\_\_\_

Page 3 of 3

\*NRPH Status Code \_\_\_\_\_

\*Resource Name or # (Assigned by recorder) Quarters 3

DESCRIPTION (continued)

A ridged hipped roof with boxed eaves tops the rectangular building. There are two large dormers aligned at the center in front and back. A shed dormer, capped by a small gable, is at the front and a truncated gable dormer is at the back. Additional small shed dormers exist on the front. The generally rectangular shape of the house is interrupted at the front where at second story level, the wall and the dormer above it protrude forward. Double doors open from that section out onto a balcony which is created by cover of the main entry porch below. A balustrade of simple posts and flat railing surrounds the balcony. The lower porch is enhanced with slightly more detailing, having a molded porch railing, a molded cornice with a plain frieze, and simple columns in the Tuscan order. Concrete steps with a solid railing lead up to the front porch.

Narrow two-part lapped siding sheathes the house. Windows are predominantly double hung sash, with most windows having a leaded glass design in the upper sash. The glass design is in the form of narrow vertical panels, with diamond shapes at the top and bottom. Other windows include sidelights at the front door, an arched bay window with brackets at the rear, a casement window with fanlight at the rear, and windows in the dormers. Additional detailing can be found in the upper story soffit, with a block pattern where every other block contains a series of small spheres. Pilasters are found on the main front dormer, in a simple rectangular relief with the same sphere pattern at the top representing capitals.

A large, two-story fireplace lines each of the two side walls of the house. One appears to be sunken into the wall and the other stands beside the wall. A pattern of sunken bricks with crenellations at the top is found just below the neck of the fireplace.

SIGNIFICANCE (continued)

Quarters 3 was built in 1901, as part of the initial wave of building construction that established the Naval Training Station as an active base between 1900 and 1923. The second wave of construction came between 1914 and 1918 in a preparedness effort for American entry into World War I. At its peak in 1917, 13,000 men were assigned to the island. Dozens of buildings were constructed during this period, the majority of which have since been demolished with changing military requirements since World War I. Twenty-three buildings currently remain from the period of the island as a Naval Training Station, making the 10 buildings of this district a more rare representation. Eight unmodified Senior Officers' Quarters remain-- including Quarters 8 that exists outside the district -- and are especially important to the history of Yerba Buena Island because they represent all of the major unmodified buildings on the island dating to its use as a Naval Training Station. Quarters 1-7 are notable because they retain not only their individual integrity but also their integrity as a group.

\*Required Information

State of California — The Resources Agency  
DEPARTMENT OF PARKS AND RECREATION  
**PRIMARY RECORD**

Primary # \_\_\_\_\_  
HRI # \_\_\_\_\_  
Trinomial \_\_\_\_\_  
NRHP Status Code \_\_\_\_\_

Other Listings \_\_\_\_\_  
Review Code \_\_\_\_\_ Reviewer \_\_\_\_\_ Date \_\_\_\_\_

Page 1 of 3

\*Resource Name or #: (Assigned by recorder) Quarters 4

P1. Other Identifier: Officers' Quarters

- \*P2. Location: ☐ Not for Publication ☒ Unrestricted \*a. County San Francisco  
and P2c, P2e, and P2b or P2d. (Attach Location Map as necessary.)  
\*b. USGS 7.5' Quad Oakland West Date 1980 T   ; R   :    ¼ of    ¼ of Sec   ;    B.M.  
c. Address Naval Station, Treasure Island City San Francisco Zip 94592-5100  
d. UTM: (Give more than one for large and/or linear resources) Zone:   ;    mE /    mN  
\*e. Other Locational Data: (E.g., parcel #, directions to resource, elevation, etc., as appropriate.)

- \*P3a. Description: (Describe resource and its major elements. Include design, materials, condition, alterations, size, setting, and boundaries.)  
Quarters 4 is a residence that was built in 1901 as Officers' Quarters. It is built upon a brick foundation, set high on the hill among a small district of Officers' Quarters. Quarters 4 faces east, looking out toward the east bay. A slope of Eucalyptus trees and other non-landscaped plants exists directly in front of the house. The general form of the building is that of the two story American four-square, with embellishments to distinguish it as Officers' Quarters and to correlate it with the neighboring quarters. (See continuation sheet.)

\*P3b. Resource Attributes: (See attributes and codes) HP34 Military Property; HP2 Single Family Property

\*P4. Resources Present: ☒ Building ☐ Structure ☐ Object ☐ Site ☐ District ☒ Element of District ☐ Other (Isolates, etc.)

P5a. Photo or Drawing (Photo required for buildings, structures, and objects.)



P5b. Description of Photo:  
(View, date, accession #) \_\_\_\_\_  
East facade, camera facing  
northwest

\*P6. Date Constructed / Age and  
Sources: ☒ Historic  
☐ Prehistoric ☐ Both  
1901

\*P7. Owner and Address:  
Naval Station  
Treasure Island  
San Francisco, CA 94130

\*P8. Recorded by: (Name, affiliation,  
and address)  
Janice Calpo  
JRP Historical Consulting  
1477 Drew Ave., Suite 105  
Davis, CA 95616

\*P9. Date Recorded: 12/23/96

\*P10. Survey Type: (Describe)  
Intensive

\*P11. Report Citation: (Cite Survey report and other sources, or enter "none.") Historical Study of Yerba Buena Island, Treasure Island, and Their Buildings  
\*Attachments: ☐ Location Map ☒ Sketch Map ☒ Continuation Sheet  
☒ Building, Structure, and Object Record ☐ Linear Resource Record ☐ Archaeological Record ☐ District Record ☐ Milling  
Station Record ☐ Rock Art Record ☐ Artifact Record ☐ Photograph Record ☐ Other (List) \_\_\_\_\_



**BUILDING, STRUCTURE, AND OBJECT RECORD**

Primary # \_\_\_\_\_

HRI# \_\_\_\_\_

Page 2 of 3

\*NRPH Status Code \_\_\_\_\_

\*Resource Name or # (Assigned by recorder) Quarters 4

- B1. Historic Name: Officers' Quarters  
B2. Common Name: Quarters 4, Officers' Quarters  
B3. Original Use: Officers' quarters B4. Present Use: Officers' quarters  
\*B5. Architectural Style: Classical Revival  
\*B6. Construction History: (Construction date, alterations, and date of alternations.)  
Built 1901.

B7. Moved? ☒ No ☐ Yes ☐ Unknown Date: \_\_\_\_\_ Original Location: \_\_\_\_\_

\*B8. Related Features:  
Senior Officers' Quarters Historic District

B9a. Architect: Bureau of Yards and Docks B9b. Builder: Bureau of Yards and Docks

\*B10. Significance: Theme Naval Training Station Area Yerba Buena Island, San Francisco

Period of Significance 1901-1947 Property Type Building Applicable Criteria A,C  
(Discuss importance in terms of historical or architectural context as defined by theme, period, and geographic scope. Also address integrity.)

Quarters 4, as a contributing element of the Senior Officers' Quarters Historic District, appears to qualify for listing in the National Register of Historic Places at the local level of significance. The district is significant for its association with the period in which Yerba Buena Island was established as one of only four Naval Training Stations in the United States, and as the only Naval Training Station on the West Coast, thereby meeting National Register Criterion A. The building also appears to qualify for listing under Criterion C, for its architecture, having integrity of design, workmanship, feeling and association. The building retains a high degree of individual integrity as well as integrity as part of the historic district. (See continuation sheet.)

B11. Additional Resource Attributes: (List attributes and codes): HP34 Military Property

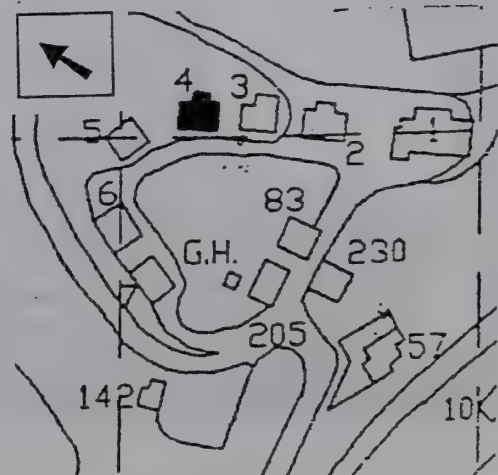
\*B12. References: Historical Study of Yerba Buena Island, Treasure Island, and Their Buildings, prepared by Mare Island Naval Shipyard Base Realignment and Closure (BRAC)

B13. Remarks:

\*B14. Evaluator: Stephen D. Mikesell  
\*Date of Evaluation: January 1997

(This space reserved for official comments.)

(Sketch Map with north arrow required.)



\*Required Information



Page 3 of 3

\*NRPH Status Code \_\_\_\_\_

\*Resource Name or # (Assigned by recorder) Quarters 4

## DESCRIPTION

A ridged hipped roof with boxed eaves tops the rectangular building. There are two large dormers aligned at the center in front and back. A shed dormer, capped by a small gable, is at the front and a truncated gable dormer is at the back. Additional small shed dormers exist on the front. The generally rectangular shape of the house is interrupted at the front where at second story level, the wall and the dormer above it protrude forward. Double doors open from that section out onto a balcony which is created by the cover of the main entry porch below. A balustrade of simple posts and flat railing surrounds the balcony. The lower porch is enhanced with slightly more detailing, having a molded porch railing, a molded cornice with a plain frieze, and simple columns in the Tuscan order. Concrete steps with a solid railing lead up to the front porch.

Narrow two-part lapped siding sheathes the house. Windows are predominantly double hung sash, with most windows having a leaded glass design in the upper sash. The glass design is in the form of narrow vertical panels, with diamond shapes at the top and bottom. Other windows include sidelights at the front door, an angled bay window with brackets at the rear, a casement window with fanlight at the rear, and windows in the dormers. Additional detailing can be found in the upper story soffit, with a block pattern where every other block contains a series of small spheres. Pilasters are found on the main front dormer, in a simple rectangular relief with the same sphere pattern at the top representing capitals.

A large, two-story fireplace lines each of the two side walls of the house. One appears to be sunken into the wall and the other stands beside the wall. A pattern of sunken bricks with crenellations at the top is found just below the neck of the fireplace.

## SIGNIFICANCE (continued)

Quarters 4 was built in 1901, as part of the initial wave of building construction that established the Naval Training Station as an active base between 1900 and 1923. The second wave of construction came between 1914 and 1918 in a preparedness effort for American entry into World War I. At its peak in 1917, 13,000 men were assigned to the island. Dozens of buildings were constructed during this period, the majority of which have since been demolished with changing military requirements since World War I. Twenty-three buildings currently remain from the period of the island as a Naval Training Station, making the 10 buildings of this district a more rare representation. Eight unmodified Senior Officers' Quarters remain-- including Quarters 8 that exists outside the district -- and are especially important to the history of Yerba Buena Island because they represent all of the major unmodified buildings on the island dating to its use as a Naval Training Station. Quarters 1-7 are notable because they retain not only their individual integrity but also their integrity as a group.

PRIMARY RECORD

Primary # \_\_\_\_\_

HRI # \_\_\_\_\_

Trinomial \_\_\_\_\_

NRHP Status Code \_\_\_\_\_

Other Listings \_\_\_\_\_

Review Code \_\_\_\_\_ Reviewer \_\_\_\_\_ Date \_\_\_\_\_

Page 1 of 3

\*Resource Name or #: (Assigned by recorder) Quarters 5

P1. Other Identifier: Officers' Quarters

\*P2. Location: ☐ Not for Publication ☒ Unrestricted \*a. County San Francisco  
and P2c, P2e, and P2b or P2d. (Attach Location Map as necessary.)

\*b. USGS 7.5' Quad Oakland West Date 1980 T   ; R   ;    ¼ of    ¼ of Sec   ;    B.M.

c. Address Naval Station, Treasure Island City San Francisco Zip 94592-5100

d. UTM: (Give more than one for large and/or linear resources) Zone:   ;    mE /    mN

\*e. Other Locational Data: (E.g., parcel #, directions to resource, elevation, etc., as appropriate.)

\*P3a. Description: (Describe resource and its major elements. Include design, materials, condition, alterations, size, setting, and boundaries.)

Quarters 5 is a residence that was built in 1901 as Officers' Quarters. It is built upon a brick foundation, set high on the hill among a small district of Officers' Quarters. Quarters 5 faces northeast, and looks out toward the east bay. A very steep slope with Eucalyptus trees exists between the house and the road, with a concrete stairway leading up to the house. (See continuation sheet.)

\*P3b. Resource Attributes: (See attributes and codes) HP34 Military Property; HP2 Single Family Property

\*P4. Resources Present: ☒ Building ☐ Structure ☐ Object ☐ Site ☐ District ☒ Element of District ☐ Other (Isolates, etc.)

P5a. Photo or Drawing (Photo required for buildings, structures, and objects.)



P5b. Description of Photo:

(View, date, accession #) \_\_\_\_\_

Northeast facade, camera facing southwest.

\*P6. Date Constructed / Age and Sources: ☒ Historic

☐ Prehistoric ☐ Both

1901

\*P7. Owner and Address:

Naval Station

Treasure Island

San Francisco, CA 94130

\*P8. Recorded by: (Name, affiliation, and address)

Janice Calpo

JRP Historical Consulting

1477 Drew Ave., Suite 105

Davis, CA 95616

\*P9. Date Recorded: 12/23/96

\*P10. Survey Type: (Describe)

Intensive

\*P11. Report Citation: (Cite Survey report and other sources, or enter "none.") Historical Study of Yerba Buena Island,

Treasure Island, and Their Buildings

\*Attachments: ☐ Location Map ☒ Sketch Map ☒ Continuation Sheet  
☐ Building, Structure, and Object Record ☐ Linear Resource Record ☐ Archaeological Record ☐ District Record ☐ Milling  
Station Record ☐ Rock Art Record ☐ Artifact Record ☐ Photograph Record ☐ Other (List) \_\_\_\_\_



**BUILDING, STRUCTURE, AND OBJECT RECORD**

Primary # \_\_\_\_\_  
HRI# \_\_\_\_\_

Page 2 of 3

\*NRPH Status Code \_\_\_\_\_

\*Resource Name or # (Assigned by recorder) Quarters 5

- B1. Historic Name: Officers' Quarters  
B2. Common Name: Quarters 5, Officers' Quarters  
B3. Original Use: Officers' quarters B4. Present Use: Officers' quarters  
\*B5. Architectural Style: Classical Revival  
\*B6. Construction History: (Construction date, alterations, and date of alternations.)  
Built 1901.

- B7. Moved? ☒ No ☐ Yes ☐ Unknown Date: \_\_\_\_\_ Original Location: \_\_\_\_\_  
\*B8. Related Features:  
Senior Officers' Quarters Historic District

- B9a. Architect: Bureau of Yards and Docks B9b. Builder: Bureau of Yards and Docks  
\*B10. Significance: Theme Naval Training Station Area Yerba Buena Island, San Francisco  
Period of Significance 1901-1947 Property Type Building Applicable Criteria A,C  
(Discuss importance in terms of historical or architectural context as defined by theme, period, and geographic scope. Also address integrity.)

Quarters 5, as a contributing element of the Senior Officers' Quarters Historic District, appears to qualify for listing in the National Register of Historic Places at the local level of significance. The district is significant for its association with the period in which Yerba Buena Island was established as one of only four Naval Training Stations in the United States, and as the only Naval Training Station on the West Coast, thereby meeting National Register Criterion A. The building also appears to qualify for listing under Criterion C, for its architecture, having integrity of design, workmanship, feeling and association. The building retains a high degree of individual integrity as well as integrity as part of the historic district. (See continuation sheet.)

- B11. Additional Resource Attributes: (List attributes and codes): HP34 Military Property

- \*B12. References: Historical Study of Yerba Buena Island, Treasure Island, and Their Buildings, prepared by Mare Island Naval Shipyard Base Realignment and Closure (BRAC)

- B13. Remarks:

- \*B14. Evaluator: Stephen D. Mikesell  
\*Date of Evaluation: January 1997

(This space reserved for official comments.)

(Sketch Map with north arrow required.)



\*Required Information



Page 3 of 3

\*NRPH Status Code \_\_\_\_\_

\*Resource Name or # (Assigned by recorder) Quarters 5

### DESCRIPTION (continued)

The general form of the building is that of the two story American four-square, with embellishments to distinguish it as Officers' Quarters and to correlate it with the neighboring quarters. A ridged hipped roof with boxed eaves tops the rectangular building. There are two large dormers aligned at the center in front and back. A shed dormer, capped by a small gable, is at the front and a truncated gable dormer is at the back. Additional small shed dormers exist on the front. The generally rectangular shape of the house is interrupted at the front where at second story level, the wall and the dormer above it protrude forward. Double doors open from that section out onto a balcony which is created by the main entry porch below. A balustrade of simple posts and flat railing surrounds the balcony. The lower porch is enhanced with slightly more detailing, having a molded porch railing, a molded cornice with a plain frieze, and simple columns in the Tuscan order. Concrete steps with a solid railing lead up to the front porch.

Narrow two-part lapped siding sheathes the house. Windows are predominantly double hung sash, with most windows having a leaded glass design in the upper sash. The glass design is in the form of narrow vertical panels, with diamond shapes at the top and bottom. Other windows include sidelights at the front door, an angled bay window with brackets at the rear, a casement window with fanlight at the rear, and windows in the dormers. Additional detailing can be found in the upper story soffit, with a block pattern where every other block contains a series of small spheres. Pilasters are found on the main front dormer, in a simple rectangular relief with the same sphere pattern at the top representing capitals.

A large, two-story fireplace lines each of the two side walls of the house. One appears to be sunken into the wall and the other stands beside the wall. A pattern of sunken bricks with crenellations at the top is found just below the neck of the fireplace.

### SIGNIFICANCE (continued)

Quarters 5 was built in 1901, as part of the initial wave of building construction that established the Naval Training Station as an active base between 1900 and 1923. The second wave of construction came between 1914 and 1918 in a preparedness effort for American entry into World War I. At its peak in 1917, 13,000 men were assigned to the island. Dozens of buildings were constructed during this period, the majority of which have since been demolished with changing military requirements since World War I. Twenty-three buildings currently remain from the period of the island as a Naval Training Station, making the 10 buildings of this district a more rare representation. Eight unmodified Senior Officers' Quarters remain-- including Quarters 8 that exists outside the district -- and are especially important to the history of Yerba Buena Island because they represent all of the major unmodified buildings on the island dating to its use as a Naval Training Station. Quarters 1-7 are notable because they retain not only their individual integrity but also their integrity as a group.

State of California — The Resources Agency  
DEPARTMENT OF PARKS AND RECREATION  
**PRIMARY RECORD**

Primary # \_\_\_\_\_  
HRI # \_\_\_\_\_  
Trinomial \_\_\_\_\_  
NRHP Status Code \_\_\_\_\_

Other Listings \_\_\_\_\_  
Review Code \_\_\_\_\_ Reviewer \_\_\_\_\_ Date \_\_\_\_\_

Page 1 of 3

\*Resource Name or #: (Assigned by recorder) Quarters 6

P1. Other Identifier: Officers' Quarters

- \*P2. Location: ☐ Not for Publication ☒ Unrestricted \*a. County San Francisco  
and P2c, P2e, and P2b or P2d. (Attach Location Map as necessary.)  
\*b. USGS 7.5' Quad Oakland West Date 1980 T\_\_\_; R\_\_\_: \_\_\_ % of \_\_\_ % of Sec \_\_\_; \_\_\_ B.M.  
c. Address Naval Station, Treasure Island City San Francisco Zip 94592-5100  
d. UTM: (Give more than one for large and/or linear resources) Zone: \_\_\_\_\_; \_\_\_\_\_ mE/ \_\_\_\_\_ mN  
\*e. Other Locational Data: (E.g., parcel #, directions to resource, elevation, etc., as appropriate.)

\*P3a. Description: (Describe resource and its major elements. Include design, materials, condition, alterations, size, setting, and boundaries.)  
Quarters 6 was built as Officers' Quarters in 1903, set high on the hillside that looks north toward Treasure Island. Both Quarters 6 and 7 are accessible only from the back which abuts the park area at the center of the Officers' housing. They are also the most simplified of the buildings among the Officers' Quarters district. (See continuation sheet.)

\*P3b. Resource Attributes: (See attributes and codes) HP34 Military Property; HP2 Single Family Property

\*P4. Resources Present: ☒ Building ☐ Structure ☐ Object ☐ Site ☐ District ☒ Element of District ☐ Other (Isolates, etc.)

P5a. Photo or Drawing (Photo required for buildings, structures, and objects.)



P5b. Description of Photo:  
(View, date, accession #) \_\_\_\_\_  
North facade, camera facing  
southeast.

\*P6. Date Constructed / Age and  
Sources: ☒ Historic  
☐ Prehistoric ☐ Both  
1903

\*P7. Owner and Address:  
Naval Station  
Treasure Island  
San Francisco, CA 94130

\*P8. Recorded by: (Name,  
affiliation, and address)  
Janice Calpo  
JRP Historical Consulting  
1477 Drew Ave., Suite 105  
Davis, CA 95616

\*P9. Date Recorded: 12/23/96

\*P10. Survey Type: (Describe)  
Intensive

\*P11. Report Citation: (Cite Survey report and other sources, or enter "none.") Historical Study of Yerba Buena Island, Treasure Island, and Their Buildings \*Attachments: ☐ Location Map ☒ Sketch Map ☒ Continuation Sheet  
☒ Building, Structure, and Object Record ☐ Linear Resource Record ☐ Archaeological Record ☐ District Record ☐ Milling  
Station Record ☐ Rock Art Record ☐ Artifact Record ☐ Photograph Record ☐ Other (List) \_\_\_\_\_



**BUILDING, STRUCTURE, AND OBJECT RECORD**

Page 2 of 3

\*NRPH Status Code \_\_\_\_\_

\*Resource Name or # (Assigned by recorder) Quarters 6

- B1. Historic Name: Officers' Quarters  
B2. Common Name: Quarters 6, Officers' Quarters  
B3. Original Use: Officers' quarters B4. Present Use: Officers' quarters  
\*B5. Architectural Style: Classical Revival  
\*B6. Construction History: (Construction date, alterations, and date of alternations.)  
Built 1903.

B7. Moved? ☒ No ☐ Yes ☐ Unknown Date: \_\_\_\_\_ Original Location: \_\_\_\_\_

\*B8. Related Features:  
Senior Officers' Quarters Historic District

B9a. Architect: Bureau of Yards and Docks B9b. Builder: Bureau of Yards and Docks  
\*B10. Significance: Theme Naval Training Station Area Yerba Buena Island, San Francisco

Period of Significance 1903-1947 Property Type Building Applicable Criteria A,C  
(Discuss importance in terms of historical or architectural context as defined by theme, period, and geographic scope. Also address integrity.)

Quarters 6, as a contributing element of the Senior Officers' Quarters Historic District, appears to qualify for listing in the National Register of Historic Places at the local level of significance. The district is significant for its association with the period in which Yerba Buena Island was established as one of only four Naval Training Stations in the United States, and as the only Naval Training Station on the West Coast, thereby meeting National Register Criterion A. The building also appears to qualify for listing under Criterion C, for its architecture, having integrity of design, workmanship, feeling and association. The building retains a high degree of individual integrity as well as integrity as part of the historic district. (See continuation sheet.)

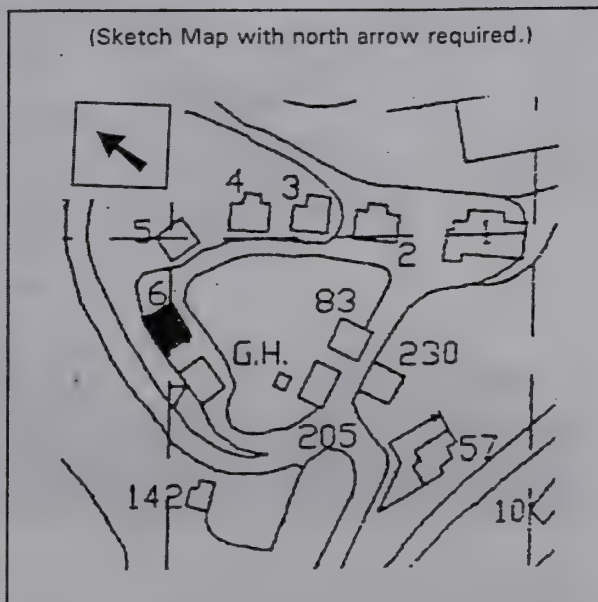
B11. Additional Resource Attributes: (List attributes and codes): HP34 Military Property

\*B12. References: Historical Study of Yerba Buena Island, Treasure Island, and Their Buildings, prepared by Mare Island Naval Shipyard Base Realignment and Closure (BRAC)

B13. Remarks:

\*B14. Evaluator: Stephen D. Mikesell  
\*Date of Evaluation: January 1997

(This space reserved for official comments.)



\*Required Information



Page 3 of 3

\*NRPH Status Code \_\_\_\_\_

\*Resource Name or # (Assigned by recorder) Quarters 6

**DESCRIPTION (continued)**

Quarters 6 is generally rectangular in plan, with a ridged hipped roof. Double lapped siding sheathes the walls. There is one angled bay window at the front right side, with the rest of the windows being predominantly 1/1 double hung wooden sash. An enclosed shed porch is located at the rear of the house giving shelter to a basement stairway. No other porches exist on the house.

**SIGNIFICANCE (continued)**

Quarters 6 was built in 1903, as part of the initial wave of building construction that established the Naval Training Station as an active base between 1900 and 1923. The second wave of construction came between 1914 and 1918 in a preparedness effort for American entry into World War I. At its peak in 1917, 13,000 men were assigned to the island. Dozens of buildings were constructed during this period, the majority of which have since been demolished with changing military requirement since World War I. Twenty-three buildings currently remain from the period of the island as a Naval Training Station, making the 10 buildings of this district a more rare representation. Eight unmodified Senior Officers' Quarters remain-- including Quarters 8 that exists outside the district -- and are especially important to the history of Yerba Buena Island because they represent all of the major unmodified buildings on the island dating to its use as a Naval Training Station. Quarters 1-7 are notable because they retain not only their individual integrity but also their integrity as a group.

State of California — The Resources Agency  
DEPARTMENT OF PARKS AND RECREATION  
**PRIMARY RECORD**

Primary # \_\_\_\_\_  
HRI # \_\_\_\_\_  
Trinomial \_\_\_\_\_  
NRHP Status Code \_\_\_\_\_

Other Listings \_\_\_\_\_  
Review Code \_\_\_\_\_ Reviewer \_\_\_\_\_ Date \_\_\_\_\_

Page 1 of 3

\*Resource Name or #: (Assigned by recorder) Quarters 7

P1. Other Identifier: Officers' Quarters

- \*P2. Location: ☐ Not for Publication ☒ Unrestricted \*a. County San Francisco  
and P2c, P2e, and P2b or P2d. (Attach Location Map as necessary.)  
\*b. USGS 7.5' Quad Oakland West Date 1980 T   ; R   :    ¼ of    ¼ of Sec   ;    B.M.  
c. Address Naval Station, Treasure Island City San Francisco Zip 94592-5100  
d. UTM: (Give more than one for large and/or linear resources) Zone:   ;    mE /    mN  
\*e. Other Locational Data: (E.g., parcel #, directions to resource, elevation, etc., as appropriate.)

- \*P3a. Description: (Describe resource and its major elements. Include design, materials, condition, alterations, size, setting, and boundaries.)  
Quarters 7 was built as Officers' Quarters in 1903, set high on the hillside that looks north toward Treasure Island. Both Quarters 6 and 7 are accessible only from the back which abuts the park area at the center of the officers' housing. They are also the most simplified of the buildings among the Officers' Quarters district. (See continuation sheet.)

- \*P3b. Resource Attributes: (See attributes and codes) HP34 Military Property: HP2 Single Family Property  
\*P4. Resources Present: ☒ Building ☐ Structure ☐ Object ☐ Site ☐ District ☒ Element of District ☐ Other (Isolates, etc.)

P5a. Photo or Drawing (Photo required for buildings, structures, and objects.)



P5b. Description of Photo:  
(View, date, accession #) \_\_\_\_\_  
North facade, camera facing  
southeast.

\*P6. Date Constructed / Age and  
Sources: ☒ Historic  
☐ Prehistoric ☐ Both  
1903

\*P7. Owner and Address:  
Naval Station  
Treasure Island  
San Francisco, CA 94130

\*P8. Recorded by: (Name,  
affiliation, and address)  
Janice Calpo  
JRP Historical Consulting  
1477 Drew Ave., Suite 105  
Davis, CA 95616

\*P9. Date Recorded: 12/23/96  
\*P10. Survey Type: (Describe)  
Intensive

- \*P11. Report Citation: (Cite Survey report and other sources, or enter "none.") Historical Study of Yerba Buena Island, Treasure Island, and Their Buildings  
\*Attachments: ☐ Location Map ☒ Sketch Map ☒ Continuation Sheet  
☒ Building, Structure, and Object Record ☐ Linear Resource Record ☐ Archaeological Record ☐ District Record ☐ Milling  
Station Record ☐ Rock Art Record ☐ Artifact Record ☐ Photograph Record ☐ Other (List) \_\_\_\_\_



**BUILDING, STRUCTURE, AND OBJECT RECORD**

Primary # \_\_\_\_\_  
HRI# \_\_\_\_\_

Page 2 of 3

\*NRPH Status Code \_\_\_\_\_

\*Resource Name or # (Assigned by recorder) Quarters 7

- B1. Historic Name: Officers' Quarters  
B2. Common Name: Quarters 7, Officers' Quarters  
B3. Original Use: Officers' quarters B4. Present Use: Officers' quarters  
\*B5. Architectural Style: Classical Revival  
\*B6. Construction History: (Construction date, alterations, and date of alternations.)  
Built 1903.

- B7. Moved? ☒ No ☐ Yes ☐ Unknown Date: \_\_\_\_\_ Original Location: \_\_\_\_\_  
\*B8. Related Features:  
Senior Officers' Quarters' Historic District

- B9a. Architect: Bureau of Yards and Docks B9b. Builder: Bureau of Yards and Docks  
\*B10. Significance: Theme Naval Training Station Area Yerba Buena Island, San Francisco

Period of Significance 1903-1947 Property Type Building Applicable Criteria A,C  
(Discuss importance in terms of historical or architectural context as defined by theme, period, and geographic scope. Also address integrity.)

Quarters 7, as a contributing element of the Senior Officers' Quarters Historic District, appears to qualify for listing in the National Register of Historic Places at the local level of significance. The district is significant for its association with the period in which Yerba Buena Island was established as one of only four Naval Training Stations in the United States, and as the only Naval Training Station on the West Coast, thereby meeting National Register Criterion A. The building also appears to qualify for listing under Criterion C, for its architecture, having integrity of design, workmanship, feeling and association. The building retains a high degree of individual integrity as well as integrity as part of the historic district. (See continuation sheet.)

- B11. Additional Resource Attributes: (List attributes and codes): HP34 Military Property

- \*B12. References: Historical Study of Yerba Buena Island, Treasure Island, and Their Buildings, prepared by Mare Island Naval Shipyard Base Realignment and Closure (BRAC)

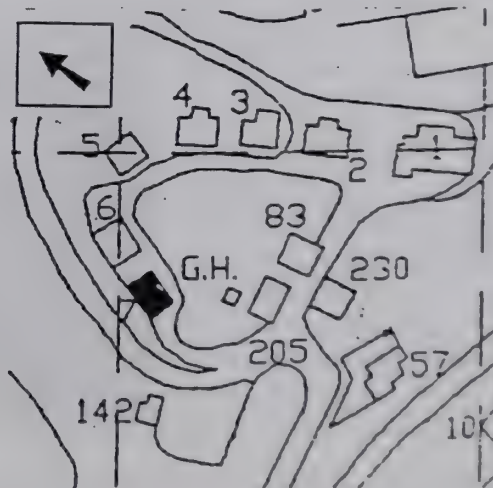
- B13. Remarks:

- \*B14. Evaluator: Stephen D. Mikesell

\*Date of Evaluation: January 1997

(This space reserved for official comments.)

(Sketch Map with north arrow required.)



\*Required Information



Page 3 of 3

\*NRPH Status Code \_\_\_\_\_

\*Resource Name or # (Assigned by recorder) Quarters 7

**DESCRIPTION (continued)**

Quarters 7 is generally rectangular in plan, with a ridged hipped roof. Double lapped siding sheathes the walls. There are two angled bay windows at the front left side, with the rest of the windows being predominantly 1/1 double hung wooden sash. An enclosed shed porch is located at the rear of the house giving shelter to a basement stairway. No other porches exist on the house.

**SIGNIFICANCE (continued)**

Quarters 7 was built in 1903, as part of the initial wave of building construction that established the Naval Training Station as an active base between 1900 and 1923. The second wave of construction came between 1914 and 1918 in a preparedness effort for American entry into World War I. At its peak in 1917, 13,000 men were assigned to the island. Dozens of buildings were constructed during this period, the majority of which have since been demolished with changing military requirements since World War I. Twenty-three buildings currently remain from the period of the island as a Naval Training Station, making the 10 buildings of this district a more rare representation. Eight unmodified Senior Officers' Quarters remain -- including Quarters 8 that exists outside the district -- and are especially important to the history of Yerba Buena Island because they represent all of the major unmodified buildings on the island dating to its use as a Naval Training Station. Quarters 1-7 are notable because they retain not only their individual integrity but also their integrity as a group.

State of California — The Resources Agency  
DEPARTMENT OF PARKS AND RECREATION  
**PRIMARY RECORD**

Primary # \_\_\_\_\_  
HRI # \_\_\_\_\_  
Trinomial \_\_\_\_\_  
NRHP Status Code \_\_\_\_\_

Other Listings \_\_\_\_\_  
Review Code \_\_\_\_\_ Reviewer \_\_\_\_\_ Date \_\_\_\_\_

Page 1 of 3

\*Resource Name or #: (Assigned by recorder) Building 83

P1. Other Identifier: Family Quarters and Garage

\*P2. Location: ☐ Not for Publication ☒ Unrestricted \*a. County San Francisco  
and P2c, P2e, and P2b or P2d. (Attach Location Map as necessary.)

\*b. USGS 7.5' Quad Oakland West Date 1980 T\_\_\_\_; R\_\_\_\_: \_\_\_\_ ¼ of \_\_\_\_ ¼ of Sec \_\_\_\_; \_\_\_\_ B.M.

c. Address Naval Station, Treasure Island City San Francisco Zip 94592-5100

d. UTM: (Give more than one for large and/or linear resources) Zone: \_\_\_\_\_; \_\_\_\_\_ mE/ \_\_\_\_\_ mN

\*e. Other Locational Data: (E.g., parcel #, directions to resource, elevation, etc., as appropriate.)

\*P3a. Description: (Describe resource and its major elements. Include design, materials, condition, alterations, size, setting, and boundaries.)

Building 83 is a garage with family quarters that was built in 1918. Garage space is located at street level, with two vehicle access doors, and a modest living space is located on a second floor above the garage area. Although the building form is a simple 1½ story rectangular plan with a front gabled roof, certain elements characterize it as craftsman in style. Roof eaves are moderately wide with prominent knee braces supporting them. Windows are 6/6 double hung wooden sash. Wide shiplap siding sheathes the walls. The building retains a high degree of integrity to its 1918 character and appearance.

\*P3b. Resource Attributes: (See attributes and codes) HP34 Military Property

\*P4. Resources Present: ☒ Building ☐ Structure ☐ Object ☐ Site ☐ District ☒ Element of District ☐ Other (Isolates, etc.)

P5a. Photo or Drawing (Photo required for buildings, structures, and objects.)



P5b. Description of Photo:

(View, date, accession #) \_\_\_\_\_  
West facade, south side, camera  
facing northeast.

\*P6. Date Constructed / Age and  
Sources: ☒ Historic

☐ Prehistoric ☐ Both

1918

\*P7. Owner and Address:

Naval Station

Treasure Island

San Francisco, CA 94130

\*P8. Recorded by: (Name,  
affiliation, and address)

Janice Calpo

JRP Historical Consulting

1477 Drew Ave., Suite 105

Davis, CA 95616

\*P9. Date Recorded: 12/12/96

\*P10. Survey Type: (Describe)

Intensive

\*P11. Report Citation: (Cite Survey report and other sources, or enter "none.") Historical Study of Yerba Buena Island,

Treasure Island, and Their Buildings \*Attachments: ☐ Location Map ☒ Sketch Map ☒ Continuation Sheet

☒ Building, Structure, and Object Record ☐ Linear Resource Record ☐ Archaeological Record ☐ District Record ☐ Milling  
Station Record ☐ Rock Art Record ☐ Artifact Record ☐ Photograph Record ☐ Other (List) \_\_\_\_\_



**BUILDING, STRUCTURE, AND OBJECT RECORD**

Primary # \_\_\_\_\_  
HRI# \_\_\_\_\_

Page 2 of 3

\*NRPH Status Code \_\_\_\_\_

\*Resource Name or # (Assigned by recorder) Building 83

- B1. Historic Name: Garage Extension and Chauffeur's Quarters  
B2. Common Name: Building 83. Family Quarters and Garage  
B3. Original Use: Garage extension & Chauffeur's quarters B4. Present Use: Family quarters  
\*B5. Architectural Style: Craftsman  
\*B6. Construction History: (Construction date, alterations, and date of alterations.)  
Built 1918. 1918-1961 -- Garage extension and chauffeur's quarters. 1961-1969 -- Rental quarters and 3-car garage. 1969-present -- Family quarters and garage.

B7. Moved? ☒ No ☐ Yes ☐ Unknown Date: \_\_\_\_\_ Original Location: \_\_\_\_\_

\*B8. Related Features:  
Senior Officers' Quarters Historic District

- B9a. Architect: Bureau of Yards and Docks B9b. Builder: Bureau of Yards and Docks  
\*B10. Significance: Theme Naval Training Station Area Yerba Buena Island, San Francisco  
Period of Significance 1918-1947 Property Type Building Applicable Criteria A,C  
(Discuss importance in terms of historical or architectural context as defined by theme, period, and geographic scope. Also address integrity.)

Building 83, as a contributing element of the Senior Officers' Quarters Historic District, appears to qualify for listing in the National Register of Historic Places. The district is significant for its association with the period in which Yerba Buena Island was established as one of only four Naval Training Stations in the United States, and as the only Naval Training Station on the West Coast, thereby meeting National Register Criterion A. As a garage associated with the Senior Officers' Quarters, the building also appears to meet Criterion C for listing in the National Register, for its architecture, having integrity of design, workmanship, feeling and association. The building has been unmodified, retaining a high degree of historic integrity. (See continuation sheet.)

B11. Additional Resource Attributes: (List attributes and codes): HP34 Military Property

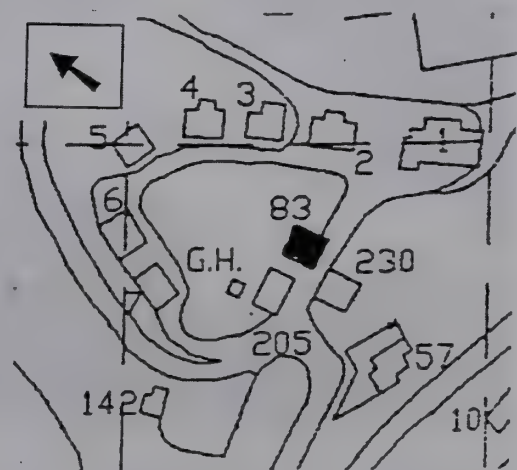
- \*B12. References: Historical Study of Yerba Buena Island, Treasure Island, and Their Buildings, prepared by Mare Island Naval Shipyard Base Realignment and Closure (BRAC)

B13. Remarks:

- \*B14. Evaluator: Stephen D. Mikesell  
\*Date of Evaluation: January 1997

(This space reserved for official comments.)

(Sketch Map with north arrow required.)



\*Required Information



Page 3 of 3

\*NRPH Status Code \_\_\_\_\_

\*Resource Name or # (Assigned by recorder) Building 83

**SIGNIFICANCE (continued)**

Building 83 was built in 1918, with the second major wave of construction during Yerba Buena Islands period as a Naval Training Station, that period being between 1900 and 1923. The second wave of construction came between 1914 and 1918 in a preparedness effort for American entry into World War I. At its peak in 1917, 13,000 men were assigned to the island. Dozens of buildings were constructed during this period, the majority of which have since been demolished with changing military requirements since World War I. Twenty-three buildings currently remain from the period of the island as a Naval Training Station, making the 10 buildings of this district a more rare representation.

Building 83 is one of three garages in the Senior Officers' Quarters Historic District; the others are Building 205 and 230. Building 83 was built in 1918, Building 205 in 1936, and Building 230 in 1944. The garages are lesser elements of the historic district, which is centered on Quarters 1-7. Nonetheless, the garages were built during the period of significance for the district and are generally compatible with the character of the area; for these reasons, the buildings are treated as contributing elements of the historic district.

State of California — The Resources Agency  
DEPARTMENT OF PARKS AND RECREATION  
**PRIMARY RECORD**

Primary # \_\_\_\_\_  
HRI # \_\_\_\_\_  
Trinomial \_\_\_\_\_  
NRHP Status Code \_\_\_\_\_

Other Listings \_\_\_\_\_  
Review Code \_\_\_\_\_ Reviewer \_\_\_\_\_ Date \_\_\_\_\_

Page 1 of 2

\*Resource Name or #: (Assigned by recorder) Building 205

P1. Other Identifier: Garage

\*P2. Location: ☐ Not for Publication ☒ Unrestricted \*a. County San Francisco  
and P2c, P2e, and P2b or P2d. (Attach Location Map as necessary.)

\*b. USGS 7.5' Quad Oakland West Date 1980 T\_\_\_\_; R\_\_\_\_: \_\_\_\_% of \_\_\_\_% of Sec \_\_\_\_; \_\_\_\_ B.M.

c. Address Naval Station, Treasure Island City San Francisco Zip ☒94592-5100

d. UTM: (Give more than one for large and/or linear resources) Zone: \_\_\_\_\_; \_\_\_\_\_mE/ \_\_\_\_\_mN

\*e. Other Locational Data: (E.g., parcel #, directions to resource, elevation, etc., as appropriate.)

\*P3a. Description: (Describe resource and its major elements. Include design, materials, condition, alterations, size, setting, and boundaries.)

Building 205 is a five unit garage, built in 1936 on a long narrow plan running parallel with the street. It has a medium-pitched side gable roof with composition roof shingles. Eaves are narrow with exposed rafters. Wide lapped weatherboard covers the sides of the structure. The garage doors are the single pivotal lift-up type with a twist handle on the outside. Rectangular louvered vents exist high in the gable ends.

\*P3b. Resource Attributes: (See attributes and codes) HP34 Military Property: HP4 Ancillary Building

\*P4. Resources Present: ☒ Building ☐ Structure ☐ Object ☐ Site ☐ District ☒ Element of District ☐ Other (Isolates, etc.)

P5. Photo or Drawing (Photo required for buildings, structures, and objects.)



P5b. Description of Photo:

(View, date, accession #) \_\_\_\_\_  
West facade, camera facing  
southeast.

\*P6. Date Constructed / Age and  
Sources: ☒ Historic  
☐ Prehistoric ☐ Both  
1936

\*P7. Owner and Address:

Naval Station  
Treasure Island  
San Francisco, CA 94130

\*P8. Recorded by: (Name,  
affiliation, and address)

Janice Calpo  
JRP Historical Consulting  
1477 Drew Ave., Suite 105  
Davis, CA 95616

\*P9. Date Recorded: 12/12/96

\*P10. Survey Type: (Describe)  
Intensive

\*P11. Report Citation: (Cite Survey report and other sources, or enter "none.") Historical Study of Yerba Buena Island,  
Treasure Island, and Their Buildings \*Attachments: ☐ Location Map ☒ Sketch Map ☐ Continuation Sheet ☒

☐ Building, Structure, and Object Record ☐ Linear Resource Record ☐ Archaeological Record ☐ District Record ☐ Milling  
Station Record ☐ Rock Art Record ☐ Artifact Record ☐ Photograph Record ☐ Other (List) \_\_\_\_\_



**BUILDING, STRUCTURE, AND OBJECT RECORD**

Page 2 of 2

\*NRPH Status Code \_\_\_\_\_

\*Resource Name or # (Assigned by recorder) Building 205

- B1. Historic Name: Garage  
B2. Common Name: Building 205, Garage  
B3. Original Use: Garage B4. Present Use: Garage  
\*B5. Architectural Style: Utilitarian  
\*B6. Construction History: (Construction date, alterations, and date of alternations.)  
Built 1936.

- B7. Moved? ☒ No ☐ Yes ☐ Unknown Date: \_\_\_\_\_ Original Location: \_\_\_\_\_  
\*B8. Related Features: \_\_\_\_\_

- B9a. Architect: Bureau of Yards and Docks B9b. Builder: Bureau of Yards and Docks  
\*B10. Significance: Theme Naval Station Area Yerba Buena Island, San Francisco  
Period of Significance 1936-1947 Property Type Building Applicable Criteria A,C

(Discuss importance in terms of historical or architectural context as defined by theme, period, and geographic scope. Also address integrity.)

Building 205, as a contributing element of the Senior Officers' Quarters Historic District, appears to qualify for listing in the National Register of Historic Places. The district is significant for its association with the period in which Yerba Buena Island was established as one of only four Naval Training Stations in the United States, and as the only Naval Training Station on the West Coast, thereby meeting National Register Criterion A. Although the garage was built in 1936, much later than the Officers Quarters that it is associated with, it is nonetheless a fitting element within the place that it occupies.

Building 205 was built in 1936, during a later period when Yerba Buena Island was being used by the Navy as a "Receiving Ship" facility, providing a lay-over facility for sailors awaiting reassignment to other ships or on-shore facilities. Building 205 is one of three garages in the Senior Officers' Quarters Historic District; the others are Buildings 83 and 230. Building 83 was built in 1918, Building 205 in 1936, and Building 230 in 1944. The garages are lesser elements of the historic district, which is centered on Quarters 1-7. Nonetheless, the garages were built during the period of significance for the district and are generally compatible with the character of the area; for these reasons, the buildings are treated as contributing elements of the historic district.

- B11. Additional Resource Attributes: (List attributes and codes): HP34 Military Property

- \*B12. References: Historical Study of Yerba Buena Island, Treasure Island, and Their Buildings, prepared by Mare Island Naval Shipyard Base Realignment and Closure (BRAC)

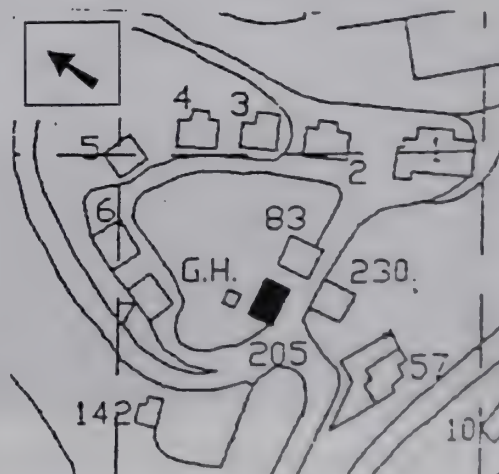
- B13. Remarks: \_\_\_\_\_

- \*B14. Evaluator: Stephen D. Mikesell

- \*Date of Evaluation: January 1997

(This space reserved for official comments.)

(Sketch Map with north arrow required.)



\*Required Information



☒ State of California — The Resources Agency  
DEPARTMENT OF PARKS AND RECREATION  
PRIMARY RECORD

Primary # \_\_\_\_\_  
HRI # \_\_\_\_\_  
Trinomial \_\_\_\_\_  
NRHP Status Code \_\_\_\_\_

Other Listings \_\_\_\_\_  
Review Code \_\_\_\_\_ Reviewer \_\_\_\_\_ Date \_\_\_\_\_

Page 1 of 3

\*Resource Name or #: (Assigned by recorder) Building 230

P1. Other Identifier: Garage and Quarters

\*P2. Location: ☐ Not for Publication ☒ Unrestricted \*a. County San Francisco  
and P2c, P2e, and P2b or P2d. (Attach Location Map as necessary.)

\*b. USGS 7.5' Quad Oakland West Date 1980 T   ; R   :     $\frac{1}{4}$  of     $\frac{1}{4}$  of Sec   ;    B.M.

c. Address Naval Station, Treasure Island City San Francisco Zip 94592-5100

d. UTM: (Give more than one for large and/or linear resources) Zone:   ;    mE/    mN

\*e. Other Locational Data: (E.g., parcel #, directions to resource, elevation, etc., as appropriate.)

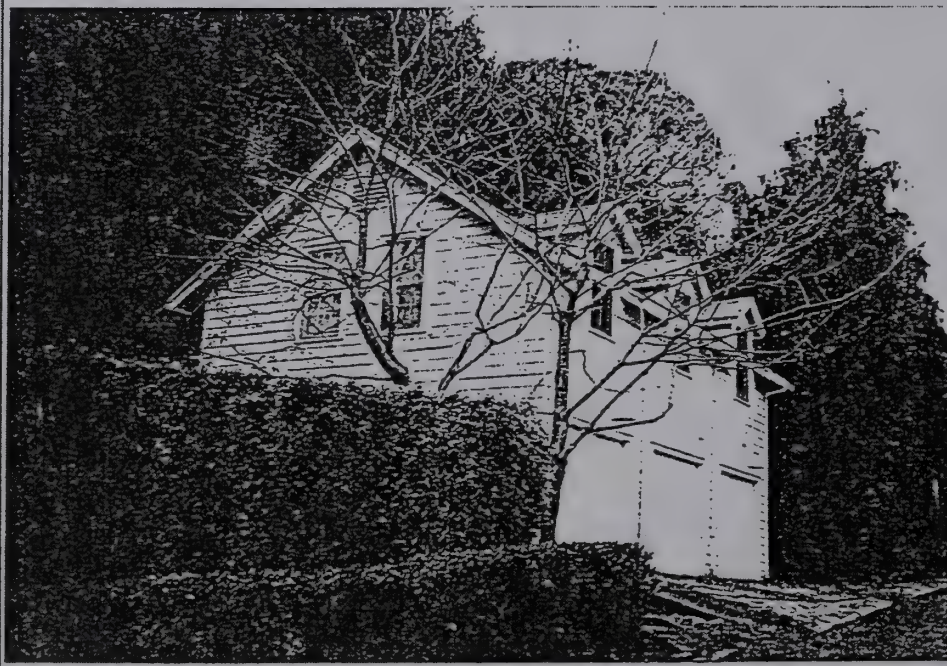
\*P3a. Description: (Describe resource and its major elements. Include design, materials, condition, alterations, size, setting, and boundaries.)

Building 230 was built in 1944 as a residence over a garage that maximizes the site on which it is built. The site is on a steep hillside, with the garage at ground level and cut into the lower edge of the hill. The residential area is built above the garage space, and is surrounded by the yard that is on the steep hillside. Having the residence on the second story above street level maximizes the views looking out to the bay, and the land surrounding it that can be used as a yard. (See continuation sheet.)

\*P3b. Resource Attributes: (See attributes and codes) HP34 Military Property: HP2 Single Family Property

\*P4Resources Present: ☒ Building ☐ Structure ☐ Object ☐ Site ☐ District ☒ Element of District ☐ Other (Isolates, etc.)

P5a. Photo or Drawing (Photo required for buildings, structures, and objects.)



P5b. Description of Photo:

(View, date, accession #) \_\_\_\_\_  
South side, north facade, camera  
facing northwest.

\*P6. Date Constructed / Age and  
Sources: ☒ Historic

☐ Prehistoric ☐ Both

1944

\*P7. Owner and Address:

Naval Station  
Treasure Island  
San Francisco, CA 94130

\*P8. Recorded by: (Name,  
affiliation, and address)  
Janice Calpo

JRP Historical Consulting  
1477 Drew Ave., Suite 105  
Davis, CA 95616

\*P9. Date Recorded: 12/12/96

\*P10. Survey Type: (Describe)  
Intensive

\*P11. Report Citation: (Cite Survey report and other sources, or enter "none.") Historical Study of Yerba Buena Island,

Treasure Island, and Their Buildings \*Attachments: ☐ Location Map ☒ Sketch Map ☒ Continuation Sheet ☒  
☒ Building, Structure, and Object Record ☐ Linear Resource Record ☐ Archaeological Record ☐ District Record ☐ Milling  
Station Record ☐ Rock Art Record ☐ Artifact Record ☐ Photograph Record ☐ Other (List) \_\_\_\_\_

**BUILDING, STRUCTURE, AND OBJECT RECORD**

Page 2 of 3

\*NRPH Status Code \_\_\_\_\_

\*Resource Name or # (Assigned by recorder) Building 230

- B1. Historic Name: Garage and Quarters  
B2. Common Name: Building 230, Garage and Quarters  
B3. Original Use: Garage and quarters B4. Present Use: Garage and quarters  
\*B5. Architectural Style: Colonial Revival  
\*B6. Construction History: (Construction date, alterations, and date of alternations.)  
Built 1944.

- B7. Moved? ☒ No ☐ Yes ☐ Unknown Date: \_\_\_\_\_ Original Location: \_\_\_\_\_  
\*B8. Related Features:  
Senior Officers' Quarters Historic District

- B9a. Architect: Bureau of Yards and Docks B9b. Builder: Bureau of Yards and Docks  
\*B10. Significance: Theme Naval Training Station Area Yerba Buena Island, San Francisco  
Period of Significance 1944-1947 Property Type Building Applicable Criteria A,C  
(Discuss importance in terms of historical or architectural context as defined by theme, period, and geographic scope. Also address integrity.)

Building 230, as a contributing element of the Senior Officers' Quarters Historic District, appears to qualify for listing in the National Register of Historic Places. The district is significant for its association with the period in which Yerba Buena Island was established as one of only four Naval Training Stations in the United States, and as the only Naval Training Station on the West Coast, thereby meeting National Register Criterion A. Although the building was built in 1944, much later than the Officers Quarters that it is associated with, it is nonetheless a fitting element within the place that it occupies. The building also retains a good degree of integrity. (See continuation sheet.)

- B11. Additional Resource Attributes: (List attributes and codes): HP34 Military Property

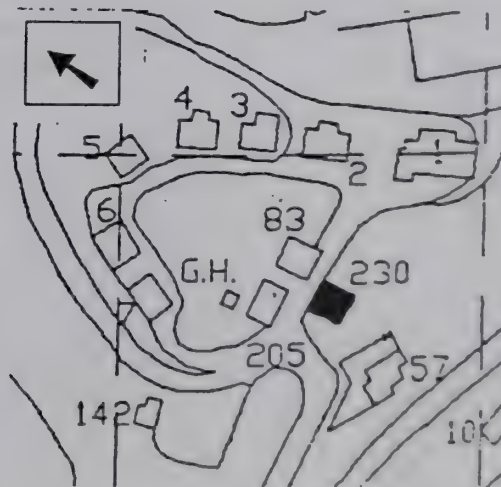
- \*B12. References: Historical Study of Yerba Buena Island, Treasure Island, and Their Buildings, prepared by Mare Island Naval Shipyard Base Realignment and Closure (BRAC)

B13. Remarks:

- \*B14. Evaluator: Stephen D. Mikesell  
\*Date of Evaluation: January 1997

(This space reserved for official comments.)

(Sketch Map with north arrow required.)



\*Required Information



CONTINUATION SHEET

Primary # \_\_\_\_\_  
HRI# \_\_\_\_\_

Page 3 of 3

\*NRPH Status Code \_\_\_\_\_

\*Resource Name or # (Assigned by recorder) Building 230

DESCRIPTION (continued)

The building has a steeply pitched side gabled roof with three gabled dormers above and parallel to the three garage doors below on the first story. Each garage door has an industrial light extending from the wall above the door. (The middle light is currently broken.) Composition shingles cover the roof and shiplap siding sheathes the walls. Windows are predominantly 6/6 double hung wooden sash, including one window placed within each dormer. Main access to the residence is up a wooden stairway and into a door at the right side of the upper story.

SIGNIFICANCE (continued)

Building 230 was built in 1944, during the seven year period in which both Yerba Buena Island and Treasure Island experienced their most frenetic use as a Naval facility during World War II. Although the building is not significant to the war efforts itself, it remains as a building associated with the earlier Senior Officers' Quarters, and has its place among the buildings of the Senior Officers' Quarters historic district. Building 230 is an integral contributor to the district as a whole.

Building 230 is one of three garages in the Senior Officers' Quarters Historic District; the others are Building 83 and 205. Building 83 was built in 1918, Building 205 in 1936, and Building 230 in 1944. The garages are lesser elements of the historic district, which is centered on Quarters 1-7. Nonetheless, the garages were built during the period of significance for the district and are generally compatible with the character of the area; for these reasons, the buildings are treated as contributing elements of the historic district.

\*Required Information

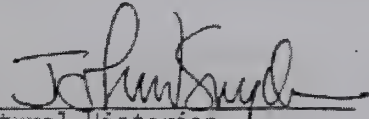


An Evaluation Of The  
San Francisco-Oakland Bay Bridge  
In Connection With  
4-SF-I280 Transfer Concept

Prepared for:

R. D. Sayre, Chief  
Environmental Branch  
District 4  
Department of Transportation

Prepared by:

John W. Snyder   
Chief Architectural Historian  
Office of Environmental Analysis  
Department of Transportation

California Department of Transportation  
Sacramento, California

August 11, 1983

## Introduction

For the purposes of this evaluation, the San Francisco-Oakland Bay Bridge is considered to be those elements of the original 1930-1937 design, as differentiated from subsequent freeway connecting structures. For clarification, please refer to attached plans and maps. These elements are carried separately by Caltrans' Office of Structures, and include Bridge No. 34-118 R/L, Bridge No. 34-117S, Bridge No. 34-116F, Bridge No. 34-03, Bridge No. 34-04, Bridge No. 33-25, Bridge No. 34C-58, Bridge No. 34C-59 and the Transbay Transit Terminal (see attached evaluation form).

## Description

These individual elements, which collectively comprise the Bay Bridge, are described as follows:

1. Bridge No. 34-118 R, the San Francisco Approaches or Lower Deck On-Ramp is comprised of continuous concrete box girders, simple span composite rolled steel stringers, and haunched concrete girders with transverse floor beams, all carried on concrete bents on spread pile footings. Originally a top deck off-ramp, this was functionally revised in 1958 following removal of interurban railroad tracks from the bridge's lower deck and conversion of the lower deck to eastbound-only traffic flow. Its 32 spans total 3,108 feet long.<sup>1</sup>
2. Bridge No. 34-118L, the Upper Deck San Francisco Approaches or Center Ramps are comprised of continuous spans with suspension span in between, rigid frame connection between superstructure and bents. The superstructure is haunched concrete T-beams with transverse floor beams, and cellular structure at cable anchorage and abutment, carried on a substructure of reinforced concrete bents on pile and spread footings. Its 56 spans total 3,850 feet long.<sup>2</sup>
3. Bridge No. 34-117S, the Upper Deck San Francisco Approaches or South Off-Ramp, is comprised of spans of two T-beam longitudinal girders with transverse floor beams on one- and two-column bents and open end diaphragm abutment, all on spread footings. Its 23 spans total 1,035.2 feet long.<sup>3</sup>
4. Bridge No. 34-116F, the Upper Deck San Francisco Approaches or North Connector (Westbound 80/Northbound 480), is comprised of a superstructure of T-girder and composite steel girder spans, carried on a substructure of reinforced concrete wall piers, two-column bents, reinforced concrete abutment with reinforced concrete wingwalls, reinforced concrete retaining walls, all on spread footings. Its 40 spans total 1,843.2 feet long.<sup>4</sup>
5. Bridge No. 34-03, West Bay Spans, is comprised of steel Warren truss approach spans carrying a double deck and supported by steel bents on concrete footings, and a double-deck suspension bridge consisting of twin bridges placed end-to-end with steel towers supported on concrete footings and caissons, and with a center concrete anchorage and two concrete end anchorages. Its 9 spans total 10,303 feet long.<sup>5</sup>



6. Bridge No. 34-04, Yerba Buena Tunnel, consists of two double-deck, cast-in-place, reinforced concrete T-beam viaducts with continuous spans, on spread footings, separated by a double-deck concrete arch tunnel. It is 1,791 feet long.<sup>6</sup>
7. Bridge No. 33-25, East Bay Spans, consists of double-deck steel truss and cantilever truss spans, steel girder spans, and concrete T-beam spans, on steel and concrete piers, concrete footings, concrete caissons, and timber piles. Its 52 spans total 11,327 feet long.<sup>7</sup>
8. Bridge No. 34C-58, Key System South Underpass (over Beale Street) is described as riveted steel girders on a concrete bent and steel bent. Its single span is 78 feet long.<sup>8</sup>
9. Bridge No. 34C-59, Key System North Underpass (over Beale Street) is described as riveted steel girders on windowed reinforced concrete bents. Its single span is 66 feet long.<sup>9</sup>
10. Transbay Transit Terminal: see attached evaluation.

#### Significance

"Even as Joseph Strauss gathered support for the Golden Gate Bridge, which he designed and later supervised as chief engineer, interest grew in a companion project: a bridge between Oakland and San Francisco to replace the picturesque but slow ferry trip.

"Engineers considered it a relatively easy challenge to span San Francisco Bay. Several low-level structures had been proposed even before the turn of the century. But the danger to ships, especially in the frequent fogs, ruled out a low-level structure. So chief engineer Charles H. Purcell, bridge engineer Charles E. Andrew and design engineer Glenn B. Woodruff agreed upon a high-level design.

"This called for two structures connected on Yerba Buena Island by a tunnel, which was the first double-decked highway tunnel in the U.S.

"The San Francisco side of the bridge is really two suspension bridges joined by a common center pier. The Oakland side combines two types of truss design, with a cantilever channel span of 1,400 feet--a distance that remained a record for more than 20 years.

"The outstanding engineering feature of the bridge is the center pier between the two 2,310-foot suspension spans of the western half. The pier extends 220 feet below the water surface to bedrock. A special caisson of steel cylinders balanced by compressed air ballast was used to position it at this record-breaking depth.

"When the bridge opened in 1936, three years after construction began, its top deck carried six lanes of auto traffic. The lower deck had three lanes for trucks and a double-track rapid transit line.



"This farsighted inclusion of a rail line on the Bay Bridge enabled electric railway cars to enter downtown San Francisco from East Bay points.

"The project cost \$77 million. Traffic first crossed it on November 12, 1936.

"As a result of the abandonment of rail service in 1958, the main change in the bridge was expansion of the roadways for mixed trucks and auto traffic: five lanes westbound above and five eastbound below.

"Reconstruction of the upper deck was completed in 1963. The work was accomplished without stopping any of the 110,000 vehicles using the bridge per day. In the first 49 days after it opened, the average traffic was 27,000 vehicles per day. Today it is 190,000 a day.

"Earthquake restrainers were added in 1976 to secure trusses and girders at their support points.

"A crew of 50 painters works full time on the 8.4-mile long structure. It takes them seven years to completely repaint 13.6 million square feet of metal."<sup>10</sup>

Notable individuals connected with the project were Charles H. Purcell, chief engineer; Charles E. Andrew, bridge engineer; Glenn B. Wooddruff, design engineer; T. L. Pflueger, Aurthur Brown, Jr., and John J. Donovan, consulting architects.

The San Francisco-Oakland Bay Bridge, designated a National Historic Civil Engineering Landmark by the American Society of Civil Engineers appears to meet National Register Criteria A, B and C at the national level.

Attachments

### Footnotes

<sup>1</sup>R. R. Bridwell and J. M. Yee, "Revised Bridge Report, Bridge No. 34-118R", California Department of Transportation, Sacramento, June 1982.

<sup>2</sup>R. R. Bridwell and J. M. Yee, "Revised Bridge Report, Bridge No. 34-118L", California Department of Transportation, Sacramento, June 1982.

<sup>3</sup>R. R. Bridwell and J. M. Yee, "Revised Bridge Report, Bridge No. 34-117S", California Department of Transportation, Sacramento, June 1982.

<sup>4</sup>R. R. Bridwell and J. M. Yee, "Revised Bridge Report, Bridge No. 34-116F", California Department of Transportation, Sacramento, June 1982.

<sup>5</sup>R. R. Bridwell and R. White, "Bridge Report, Bridge No. 34-03", California Department of Transportation, Sacramento, December 1980.

<sup>6</sup>R. R. Bridwell and R. White, "Bridge Report, Bridge No. 34-04", California Department of Transportation, Sacramento, December 1980.

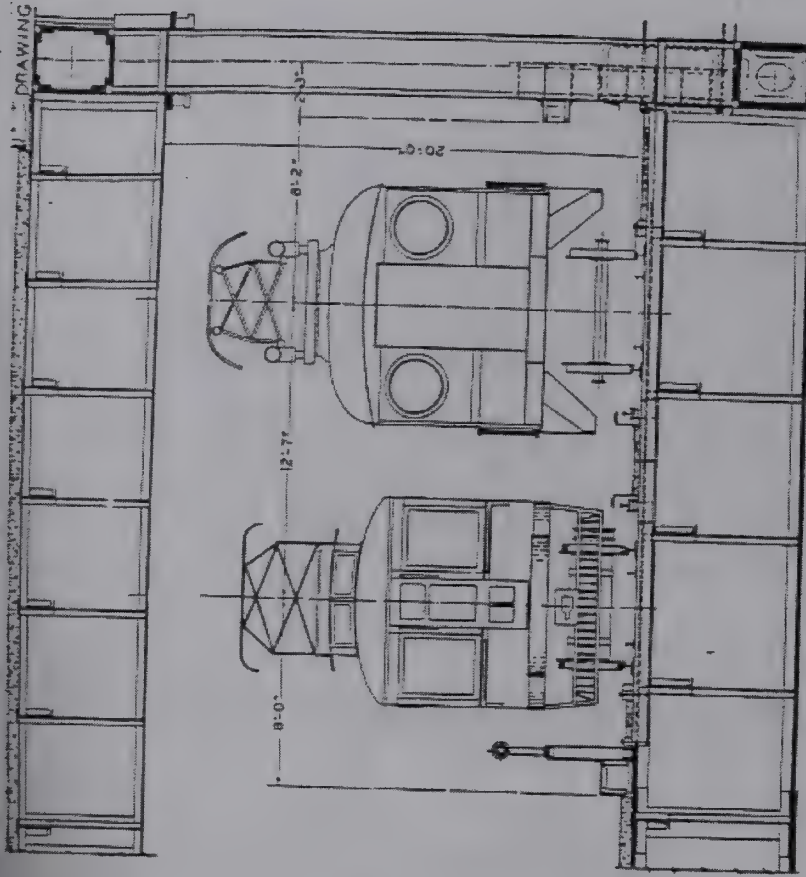
<sup>7</sup>R. R. Bridwell and R. White, "Bridge Report, Bridge No. 33-25", California Department of Transportation, Sacramento, December 1980.

<sup>8</sup>F. C. Heggli, "Bridge Report, Bridge No. 34C-58", California Department of Transportation, Sacramento, October 27, 1977.

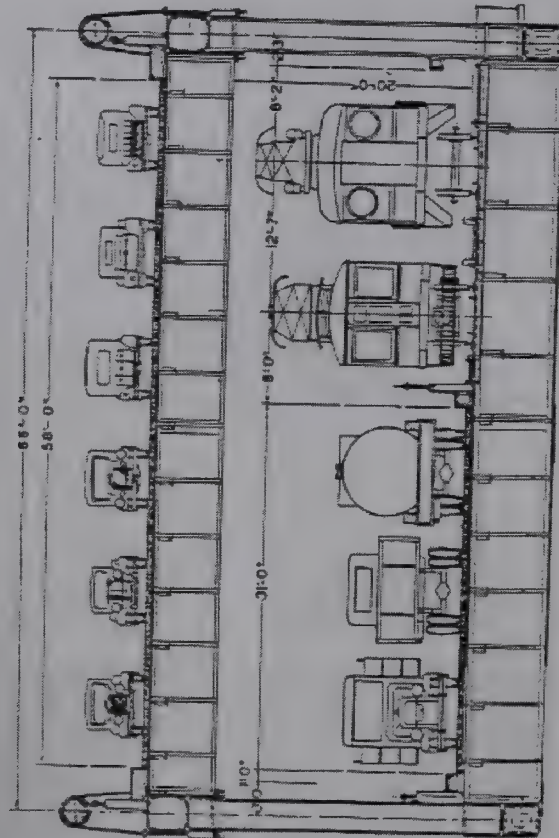
<sup>9</sup>F. C. Heggli, "Bridge Report, Bridge No. 34C-59", California Department of Transportation, Sacramento, October 27, 1977.

<sup>10</sup>"The San Francisco-Oakland Bay Bridge", P. G. & E. Progress, August 1979.

DRAWING

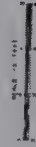


ENLARGED CROSS SECTION SHOWING TRACKS



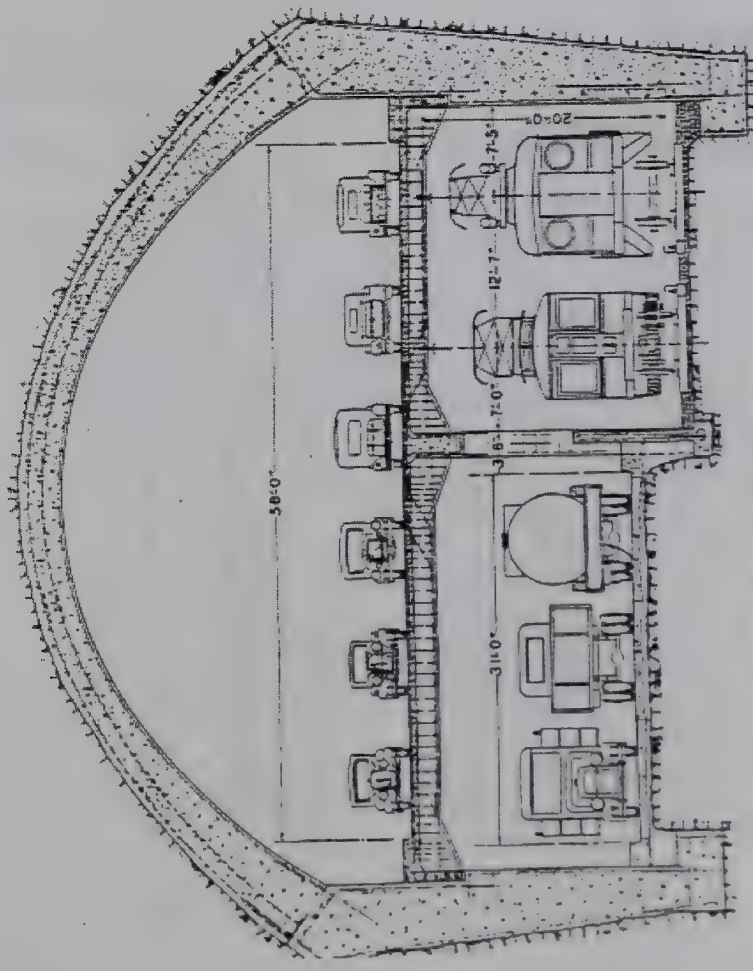
CROSS SECTION THRU BRIDGE

STATE OF CALIFORNIA  
DEPARTMENT OF PUBLIC WORKS  
SAN FRANCISCO AND SAN JOSE  
WEST BAY CROSSING  
TYPICAL SECTION

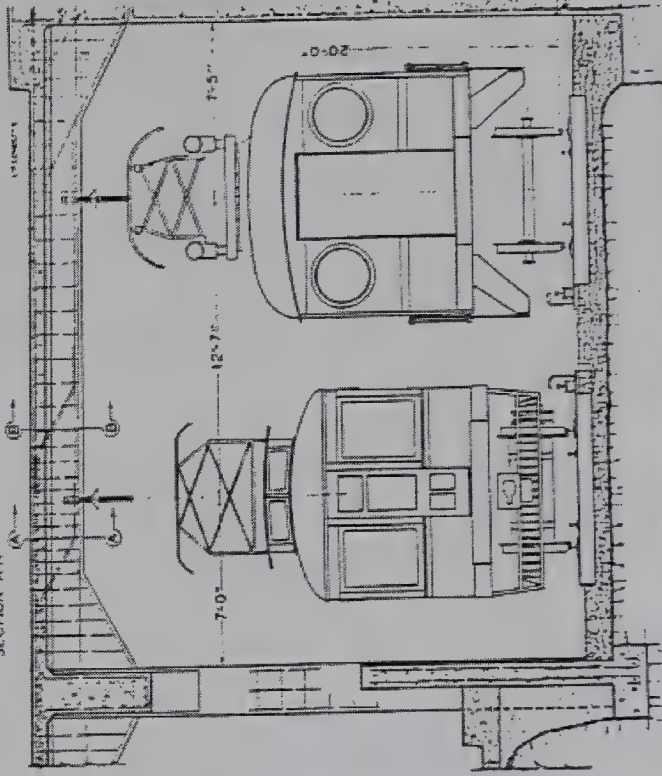




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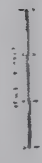


CROSS SECTION THRU TUNNEL



ENLARGED CROSS SECTION SHOWING TRACKS

STATE OF CALIFORNIA  
 DEPARTMENT OF PUBLIC WORKS  
 SAN FRANCISCO OAKLAND BRIDGE  
 YERBA BUENA CROSSING  
 TUNNEL SECTION





## **ATTACHMENT D**

---

### Archaeological Survey Report





## FINDING OF EFFECT

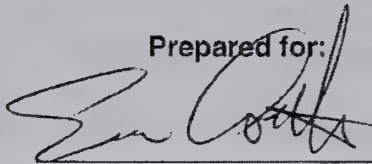
### Yerba Buena Island Ramps Improvement Project

San Francisco, California

04-SF-80, PM 12.3-13.2/7.6-8.1

EA 04-3A64OK

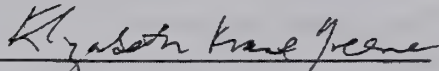
Prepared for:



Eric Cordoba, Project Manager  
SFCTA

100 Van Ness Avenue, 26th Floor  
San Francisco, CA 94102

Approved by:



Elizabeth Kruse, Branch Chief, South Counties  
Office of Cultural Resource Studies  
Caltrans District 4  
111 Grand Avenue  
Oakland, California 94623

Prepared By:



Toni Webb, Architectural Historian  
JRP Historical Consulting, LLC  
1490 Drew Avenue, Suite 110  
Davis, CA 95618

October 2009

## TABLE OF CONTENTS

1. INTRODUCTION.....	1
2. DESCRIPTION OF THE UNDERTAKING .....	2
2.1. Project Description .....	2
2.2. Area of Potential Effects (APE) .....	4
3. PUBLIC PARTICIPATION.....	6
4. DESCRIPTION OF HISTORIC PROPERTIES .....	7
4.1. Efforts to Identify Historic Properties .....	7
4.1.1. Efforts to Identify: Built Environment .....	7
4.2. Description of Historic Properties .....	8
4.2.1. Description: .....	8
4.2.2. Archaeological Site CA-SFr-04/H .....	11
5. APPLICATION OF THE CRITERIA OF ADVERSE EFFECT .....	11
5.1. Criteria of Adverse Effect .....	11
5.2. Analysis of Effect to Historic Properties.....	13
5.2.1. No-Build Alternative .....	13
5.2.2. Alternative 2B .....	13
5.2.3. Alternative 4.....	15
5.2.4. Noise Effects .....	17
5.2.5. Cumulative Effects .....	17
6. ALTERNATIVES CONSIDERED BUT REJECTED .....	20
6.1. Non-Viable Alternatives.....	20
6.1.1. Alternative 1 .....	20
6.1.2. Alternative 1A .....	21
6.1.3. Alternative 2 .....	22
6.1.4. Alternative 2A .....	23
6.1.5. Alternative 3 .....	23
6.1.6. Alternative 5 .....	24
7. Proposed Mitigation .....	25
7.1. Efforts to Avoid or Minimize Adverse Effects .....	25
7.2. Proposed Mitigation Measures .....	25
8. CONCLUSIONS .....	29
9. REFERENCES .....	30
10. PREPARERS' QUALIFICATIONS .....	31

## ATTACHMENTS

Appendix A: Project Maps

Appendix B: Visual Simulations and Renderings

Appendix C: Project Public Participation

Appendix D: National Register of Historic Places Correspondence



## 1. INTRODUCTION

San Francisco County Transportation Authority (SFCTA) proposes the replacement of westbound on- and off-ramps on the east side of Yerba Buena Island. The proposed project would improve the seismic, traffic safety requirements, and design standards of the current ramps. SFCTA is the Lead Agency under CEQA while Caltrans is the lead agency under NEPA. JRP Historical Consulting, LLC (JRP) prepared this Finding of Effect (FOE) as part of the environmental compliance for the Project. The purpose of this document is to comply with applicable sections of the National Historic Preservation Act (NHPA) and the implementing regulations of the Advisory Council on Historic Preservation (ACHP) as these pertain to federally funded undertakings and their impacts on historic properties.

The Historic Property Survey Report (HPSR) prepared for this project identified five historic properties within the Focused APE for this Project: Senior Officers' Quarters Historic District; Quarters 10 (which includes Building 267); Quarters 8; a portion of the East Span of the San Francisco-Oakland Bay Bridge (SFOBB); and prehistoric site CA-SFr-04/H. The Focused APE and plan views of the historic properties and the proposed project alternatives are provided in Appendix A, with existing and simulated views of the proposed alternatives in Appendix B.

The Senior Officers' Quarters district, Quarters 10, and the SFOBB are listed in the National Register of Historic Places (NRHP) and the California Register of Historical Resources (CRHR). Quarters 8 has been determined eligible for listing in the NRHP and CRHR. The State Historic Preservation Officer (SHPO) concurred (August 1998) that the prehistoric component of CA-SFr-04/H was a contributing element to the site's NRHP eligibility but that the historic-era components consisting of various structure remains and refuse deposits and elements of the U.S. Naval Training Station were non-contributing elements. Even though no column footings are proposed within or near CA-SFr-04/H for any alternative, an ESA will be established for this site.

All of the historic properties are also considered historical resources for the purposes of CEQA. Although a portion of the East Span of the SFOBB is located within the Focused APE, this historic property was documented as part of the SFOBB East Span Seismic Safety (Earthquake Retrofit) Project, which was completed in 2001. Because the current project proposes the construction of new ramps that would connect to the new East Bay Span currently under construction, the proposed project has no potential to affect the existing SFOBB historic property. No further study of the SFOBB as a historic resource was required for this project. These properties are further described in Section 4.

This FOE concludes that construction of Project Alternative 2B and Alternative 4 would cause an Adverse Effect to the Senior Officers' Quarters Historic District (including Quarters 1) and Quarters 10 (and Building 267). Caltrans has determined that the undertaking will have an Adverse Effect on historic properties pursuant to Section 106 Programmatic Agreement (Section 106 PA) Stipulation X.C. and, is consulting SHPO regarding the resolution of adverse effects, pursuant to Section 106 PA Stipulation XI, 36 CFR 800.6(a), and 800.6(b)(1).

## 2. DESCRIPTION OF THE UNDERTAKING

### 2.1. Project Description

Yerba Buena Island (YBI) is located in the San Francisco Bay approximately halfway between Oakland and San Francisco.<sup>1</sup> YBI is only accessible to vehicular traffic via the San Francisco Oakland Bay Bridge (SFOBB) stretch of I-80. The SFOBB is considered a “lifeline structure” and is a critical link between the East Bay and San Francisco. It provides the only vehicle access to YBI, the active U.S. Coast Guard (USCG) facilities located on the south side of the island, and Treasure Island, located immediately north of YBI. See Maps 1-5, Appendix A.

The proposed project would replace the existing westbound on- and off-ramps located on the east side of YBI with new westbound on- and off-ramps. The proposed project would not change the existing exit and entrance ramps on the west side of the YBI tunnel. The new ramps would maintain the functional role of the current ramps while satisfying seismic requirements, highway design standards, traffic operations, and improve safety. Although the APE maps appear to show the ramps impacting CA-SFr-04/H (ESA-1a, 1b), the ramp is actually an elevated structure and no support columns are planned within or near ESA 1a or 1b. The YBI Ramps Improvement Project is independent of both the SFOBB East Span Seismic Safety Project, currently under construction, and the Treasure Island and Yerba Buena Island (TI/YBI) Redevelopment Plan, currently undergoing its own environmental review process.

The purpose of the project is to improve the safety of the westbound on- and off-ramps to the extent physically and economically feasible. The current ramps do not meet current Caltrans design standards. The proposed project would provide standard deceleration length for the off-ramp and improved acceleration/merging length for the on-ramp. In addition, the project would improve traffic operations to and from YBI.

Alternatives have been proposed to address the geometric deficiencies of the existing on- and off-ramps. In addition to the no-build alternative, the proposed build alternatives would analyze the effects to the SFOBB (I-80) mainline structure and YBI. The proposed project is located between post-mile (PM) 7.6 and 8.1<sup>2</sup> beginning at the east portal of the YBI tunnel and ending at the east side of the Transition Structure portion of the new SFOBB. The SFOBB Transition Structure is located between PM 7.9 and 8.1 between the YBI tunnel and the SFOBB Self-Anchored Suspension (SAS) span.<sup>3</sup>

#### **No Build Alternative**

This Alternative assumes that the existing on- and off-ramps would remain in place and no further action or improvements would occur.

#### **Alternative 2B**

Alternative 2B would include removal of the existing westbound on- and off-ramps on the east side of YBI, construction of a westbound loop on-ramp from Macalla Road on the east side of YBI, and construction of a westbound off-ramp to Macalla Road on the east side of YBI.

---

<sup>1</sup> The project description was prepared by EDAW/AECOM.

<sup>2</sup> Kilometer Post (KP) 12.3 and 13.2.

<sup>3</sup> The SFOBB Transition Structure is the name of a section of the new Bay Bridge. The Transition Structure will connect the Self-Anchored Suspension (SAS) span to Yerba Buena Island, and will transition the East Span's side-by-side road decks to the upper and lower decks of the YBI tunnel and West Span.



Alternative 2B is the locally preferred alternative. Alternative 2B is shown in the first sheet of Map 3, as well as in plan view in Map 4, Appendix A. Views showing existing and proposed conditions for Alternative 2B appear in Figures 6-13, Appendix B.

This alternative proposes to reconstruct two of the existing six on- and off-ramps at the I-80/YBI interchange. The proposed on- and off-ramps would provide standard shoulder widths, and would include the following features:

- Westbound on-ramp on the east side of YBI – This ramp would begin at a “T” intersection at Macalla Road, loop right with a tight radius, and merge on to the north side of the Bay Bridge. The length of this ramp would be approximately 876 feet (267 meters). This ramp would have two traffic lanes, merging into one as it connects to the SFOBB. One lane would be a high occupancy vehicle (HOV) lane and the other a mixed-flow<sup>4</sup> lane.
- Westbound off-ramp on the east side of YBI – This ramp would diverge from the new SFOBB Transition Structure between bents W3 and W4 curving around the Nimitz House and terminate at a “T” intersection at Macalla Road. The length of this ramp would be approximately 1,115 feet (340 meters). A stop sign is proposed at the ramp terminus.
- Macalla Road would be widened for approximately 660 feet adjacent to the terminus of the westbound on- and off-ramps. The existing roadway is about 20 feet wide near the ramp terminus. The roadway widening is required to accommodate a 12-foot wide multi-use pedestrian/bike path and two 12-foot wide lanes within the Caltrans right-of-way. A retaining wall would be constructed adjacent to Macalla Road to provide the required width. The height of the retaining wall would vary from 4 to 16 feet and would retain the hillside above Macalla Road. The stairway adjacent to the Caltrans Substation would be relocated to the west side of the building to make room for the new retaining wall. The roadway width would vary around the curve at South Gate Road to provide proper width for truck turning movements.
- Under Alternative 2B, the westbound on- and off-ramps would terminate at Macalla Road where Quarters 10 and Building 267 are currently located, requiring their removal.<sup>5</sup>

#### **Alternative 4**

Alternative 4 would include the removal of the existing westbound on- and off-ramps on the east side of YBI, construction of westbound on-ramp from South Gate Road, and construction of westbound off-ramp to Macalla Road on the east side of YBI. Alternative 4 is shown in the second sheet of Map 3, as well as in plan view in Map 5, Appendix A. Views showing existing and proposed conditions for Alternative 4 appear in Figures 14-21, Appendix B.

This alternative proposes to reconstruct two of the existing six on- and off-ramps at the I-80/YBI interchange. The proposed on- and off-ramps would provide standard shoulder widths, and would include the following features:

- Westbound on-ramp on the east side of YBI. This ramp would begin at South Gate Road, proceed east paralleling the eastbound on-ramp, loop under the new SFOBB Transition

<sup>4</sup> A mixed-flow lane is a general purpose travel lane with no traffic restrictions.

<sup>5</sup> Quarters 10 and Building 267 (a contributing garage) are listed in the National Register of Historic Places at the local level, under Criterion C, as a significant example of mid twentieth century residential architecture.



Structure near its eastern end to provide adequate merging distances, and cross over the westbound off-ramp at the north side of the SFOBB. The ramp would be approximately 2,883 ft (879 meters) long. An HOV lane would not be provided under Alternative 4.

- Westbound off-ramp on the east side of YBI. This ramp would diverge from the new SFOBB Transition Structure between bents W2 and W3, parallel the Transition Structure, cross under the westbound on-ramp and terminate at a "T" intersection at North Gate Road. The length of this ramp would be approximately 1,168 feet (356 meters). A stop sign is proposed at the ramp terminus.
- Macalla Road would be widened for approximately 660 feet adjacent to the terminus of the westbound on-and off-ramps. The existing roadway is about 20 feet wide near the ramp terminus. The roadway widening is required to accommodate a 12-foot wide multi-use pedestrian/bike path and two 12-foot wide lanes within the Caltrans right-of-way. A retaining wall would be constructed adjacent to Macalla Road to provide the required width. The height of the retaining wall would vary from 4 to 16 feet and would retain the hillside above Macalla Road. The roadway width would vary around the curve at South Gate Road to provide proper width for truck turning movements.
- Under Alternative 4, Quarters 10 and Building 267 and its associated landscaping would remain in place.

## **2.2. Area of Potential Effects (APE)**

JRP Historical Consulting, LLC (JRP), in consultation with the California Department of Transportation (Caltrans), developed the architectural Area of Potential Effects (APE) for this project in October 2008. Caltrans signed the APE on October 23 and 24, 2008. The APE is composed of two areas: a General APE and Focused APE. The General APE was developed to encompass both the project area, and the contributing elements of the large, linear, multi-component SFOBB historic property that extend outside of the project area. The Focused APE encompasses only the project area; therefore, those portions of the SFOBB property that may be potentially affected by the Project are included.

The Focused APE maps for historic architecture are shown in Map 2 and Map 3 (first two sheets), in Appendix A. Consistent with Caltrans policies and general cultural resource practices, the APE for the built environment encompassed areas that might be either directly or indirectly affected by construction; i.e., those areas within which the project could cause a change in character or use of historic properties. A small segment of the westernmost portion of the East Span is extant within the Focused APE. Besides the SFOBB, there are three other resources within the Focused APE: the Senior Officers' Quarters Historic District, Quarters 10 (which includes Building 267), and Quarters 8, see Maps 4–5, Appendix A. Only those resources located within the architectural APE were included in the survey. Because the current project proposes the construction of new ramps that would connect to the new East Bay Span currently under construction, the proposed project has no potential to affect any components of the existing SFOBB historic property and it did not require further study under this FOE. The Focused APE for archaeological resources is depicted on Map 3 (last two sheets of Map 3) and includes all areas that could be subject to ground-disturbing activities under Alternative 2B or Alternative 4.

The archaeological APE was developed in consultation with Caltrans and includes only the project area and not elements of the SFOBB property. This does not include areas containing standing historic buildings and structures such as the Senior Officer's Quarters Historic District, Quarters 10 and Quarters 8. The archaeological APE only includes areas that would be potentially subject to ground disturbances related to activities such as project construction, equipment staging, and materiel storage. This APE was also developed considering the location of CA-SFr-04/H. While no ground-disturbing activities are planned that would impact this site, the site could be subject to unintended disturbances related to project construction.

### 3. PUBLIC PARTICIPATION

This section presents the environmental and Section 106 process activities that have been completed and those taking place concurrently with the preparation of this Draft FOE. To date, efforts to involve the public in the Section 106 process have included:

- SFCTA issued a Notice of Preparation (NOP) on September 5, 2008.
- Caltrans issued a Notice of Intent (NOI) to prepare a joint Environmental Impact Statement/Environmental Impact Report (EIS/EIR) on September 5, 2008.
- A Public Scoping meeting was held at the Port of San Francisco office, Bayside Conference Room, Pier 1, San Francisco, on September 24, 2008. The consultant for historic architectural resources attended the meeting. No comments or questions were received regarding historic architectural resources.
- San Francisco Bay Conservation and Development Commission (BCDC) -- Design Review Board held a public hearing on April 6, 2009. SFCTA gave an informational presentation on the project and its progress. No comments or questions were received regarding historic architectural resources.
- EDAW sent a contact letter to the Native American Heritage Commission (NAHC) on November 7, 2008 requesting a search of the Sacred Lands File and a list of suitable Native American tribal organizations and individuals that might have an interest in or concerns with the Project. EDAW sent contact letters to the NAHC-suggested Ohlone/Costanoan representatives on December 17, 2008 and followed up with phone calls approximately two weeks later. No responses were received.
- JRP, on behalf of SFCTA, sent letters to interested parties on December 11, 2008, to inform area planning agencies, local governments, historical societies, museums, and other interested parties of the proposed project. No responses were received. Copies of the transmittal letters are included in Appendix C. The following organizations received this letter:

San Francisco Architectural Heritage  
San Francisco Landmark Preservation Advisory Board  
Preservation Coordinator, San Francisco Planning Department  
San Francisco History Association  
San Francisco Museum and Historical Society  
California Historical Society  
San Francisco Beautiful  
California Heritage Council  
California Preservation Foundation  
National Trust for Historic Preservation Western Office  
National Park Service, Pacific West Region Office  
Oakland Heritage Alliance  
Oakland Landmarks Preservation Advisory Board  
Oakland Cultural Heritage Survey  
Alameda County Historical Society  
Alameda County Parks, Recreation and Historical Commission



## **4. DESCRIPTION OF HISTORIC PROPERTIES**

### **4.1. Efforts to Identify Historic Properties**

#### **4.1.1. Efforts to Identify: Built Environment**

Previous projects have identified, evaluated, and in some cases listed in the National Register, four historic properties that are located within the Focused APE for the current project:

- Senior Officers' Quarters Historic District (a multi component property)
- Quarters 10 (a property that includes Building 267)
- Quarters 8
- a portion of the East Span of the San Francisco-Oakland Bay Bridge (SFOBB).

All four historic properties were previously evaluated, and although they did not require re-evaluation for the current project, the properties were field checked and update forms were prepared for the District and the individual quarters buildings. The updates forms were included in the HPSR for this project. A summary of identification efforts conducted to date is as follows:

The Senior Officers' Quarters Historic District is listed in the National Register of Historic Places (NRHP) and the California Register of Historical Resources (CRHR). JRP inventoried and evaluated the district in 1997 as part of the report entitled "Cultural Resources Inventory and Evaluation Investigations: Yerba Buena Island and Treasure Island Naval Station Treasure Island, San Francisco, California." The State Historic Preservation Officer (SHPO) generally concurred with the finding of this report in October 1997 (OHP Reference USN 970708A) and requested some clarifications for the district property. Final SHPO concurrence was obtained in 1998.<sup>6</sup> Five years later, in 2003, JRP completed a NRHP nomination for the district, as well as Historic American Building Survey (HABS No. CA-1793-A through -K) documentation. The district was listed in the NRHP and CRHR on February 26, 2008.<sup>7</sup>

Quarters 10 and Building 267 are listed in the NRHP and the CRHR. Caltrans inventoried and evaluated Quarters 10 in 1998 as part of the report entitled "Historic Architecture Survey Report for the Construction of a New East Span for the San Francisco-Oakland Bay Bridge." As a result of that survey, Caltrans found that Quarters 10 and its associated garage (Building 267) appeared to be eligible for listing in the NRHP at the local level of significance under Criterion C, as significant example of mid twentieth century residential architecture. SHPO concurred with those findings in 1998. JRP prepared a NRHP nomination for the district in 2003, and on February 26, 2008, this property was listed in the NRHP and CRHR.<sup>8</sup>

Quarters 8 has been determined eligible for listing in the NRHP and CRHR. JRP inventoried and evaluated Quarters 8 in 1997 as part of the report entitled "Cultural Resources Inventory and Evaluation Investigations: Yerba Buena Island and Treasure Island Naval Station Treasure Island, San Francisco, California." SHPO generally concurred with the finding of this report in

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<sup>6</sup> Caltrans, "Historic Property Survey Report, San Francisco-Oakland Bay Bridge East Span Seismic Safety Project," EA 01200 (September 1998).

<sup>7</sup> National Register Information System Reference Nos. 08000085 and 91001380; HABS No. CA-233-A (1998); and see correspondence in Appendix D.

<sup>8</sup> National Register Information System Reference No. 08000084; and see correspondence in Appendix D.

October 1997 (SHPO Reference USN 970708A) and requested clarification for some buildings. Final concurrence was obtained in 1998.<sup>9</sup>

SFOBB is a multi-component property listed in the NRHP and the CRHR. This historic property was inventoried, evaluated, and documented as part of the SFOBB East Span Seismic Safety (Earthquake Retrofit) Project in 2000–2001. The historic bridge property was listed in the NRHP and CRHR on August 13, 2001.<sup>10</sup> A portion of the East Span of the SFOBB is located within the Focused APE; however, the current project proposes construction of new ramps that will connect to the new East Bay Span structure currently under construction and the proposed project has no potential to affect the existing SFOBB historic property. No further study of the SFOBB as a historic property was required for this project.

The detailed background information for these properties and previous identification efforts were provided in the Historic Resources Evaluation Report (HRER) prepared for this project. The HRER provides updates of the previous inventory and evaluation of the three historic properties identified above: Senior Officers' Quarters Historic District, Quarters 10, and Quarters 8. The HRER concluded that the Senior Officers' Quarters Historic District, Quarters 10/Building 267, and Quarters 8 have remained relatively unchanged since they were listed or determined eligible for listing in the NRHP and changes to their listing or eligibility were not warranted. All of these properties remain historical resources for the purposes of CEQA.

## **4.2. Description of Historic Properties**

### **4.2.1. Description:**

This section describes three historic architectural properties within the project APE that are listed in the National Register or have been determined eligible for listing in the National Register and that have the potential to be affected by the proposed project. The location of these properties in relation to the two alternatives is shown in Map 4 and Map 5, Appendix A.

#### Quarters 8

#### Map Reference 1

Quarters 8, a symmetrical three-story, wood-frame, Mediterranean style residence constructed in 1905, has been determined eligible for the National Register at the local level of significance. The building is significant under Criterion A within the context of military history, and under Criterion C, as an unusual example of Mediterranean-style architecture and as the work of the master architectural firm of the Reid Brothers. The period of significance extends from 1905 to 1947. Character-defining features of Quarters 8 include its massing, recessed third floor, symmetrical façade, smooth stucco and wood siding, parapets, full-width front porch with square columns and solid railing, second-floor balcony, hip roof with box cornice and block modillions, and original fifteen-over-one, twelve-over-one, and eight-over-one double hung wood windows, exterior brick chimneys, and triangular-shaped property.

#### Quarters 10 (and Building 267)

#### Map Reference 2

Quarters 10, a 1948 Moderne/International/Bay Region residence and its contributing garage (Building 267), are listed in the National Register. The property is significant at the local level

<sup>9</sup> Caltrans, "HPSR, San Francisco-Oakland Bay Bridge East Span Seismic Safety Project," (September 1998).

<sup>10</sup> National Register Information System Reference No. 00000525; and see correspondence in Appendix D.



under Criterion C, as significant example of mid twentieth century residential architecture. The property boundary includes Quarters 10, Building 267 and the landscape immediately adjacent to these buildings including lawn, garden, driveway and the northern retaining wall. The period of significance for this property is 1948, the year of its construction. Character-defining features of Quarters 10 include its setting and landscape, and those distinctive architectural characteristics of the International, Moderne and Bay (Regional) Tradition styles: flat roof with overhanging eaves supported by slender pipe columns; exposed rafters; corner windows; casement windows with horizontal muntins; curved east wall; board formed concrete wall surface; and lap wood siding. Character-defining features of Building 267 are similar to Quarters 10 and include the lap wood siding, board formed concrete wall surface, flat roof with overhanging eaves, and exposed rafter tails.

#### Senior Officers' Quarters Historic District (and Quarters 1)

Map Reference 3

The Senior Officers' Quarters Historic District is listed in the National Register. The district includes eleven contributing elements: seven residences (Quarters 1 through 7), two apartments/garages (Buildings 83 and 230), a five-car garage (Building 205), and the landscape that surrounds the district. The district is generally bounded by North Gate Road on the west and north, the greensward on the east, the SFOBB and hillside on the south, and the southern edge of the informal landscaping south of Building 230 and directly west of Quarters 1. The property is significant at the local level under Criterion A, for its association with the early development of military facilities on the West Coast, and under Criterion C, as significant examples of Classical Revival/Colonial Revival residential architecture. The period of significance for the district extends from 1900, when the first building was constructed, to 1947, when the station was decommissioned as a "Receiving Ship" facility and ceased its operations as a naval training and distribution center.



**Figure 1. View of historic district looking north, with Quarters 1 in left foreground.**  
[Treasure Island Museum Collection, unnumbered.]

The character-defining features of the district include its setting: relationship between each contributing building, size and massing of buildings, landscaping (greensward in front of Quarters 1-3, formal terraced garden behind Quarters 1, central terraced garden behind Quarters 2-5, planting beds adjacent to each building, and hardscape, such as walkways, patios, masonry walls, and roadways); historic integrity of individual contributors (Quarters 1 through 7, Quarters 10, Buildings 267, 83, 205, and 230, and the landscape within the district boundary); the



Classical Revival/Colonial Revival architecture; and view shed from Quarters 1–5. Additionally, Quarters 1 is listed in the National Register as an individual property and is significant under Criterion A, for its association with the development of West Coast military facilities, and under Criterion C, as an important example of Classical Revival architecture. Its period of significance is identified as 1898–1916. The character-defining features of this building consist of those architectural features that contribute to its Classical Revival style including, but not limited to, its size and massing, symmetrical façade, brick foundation, porch with portico, dormers, weatherboard siding with decorative cornerboards, stringcourse between first and second floors, flared eaves with box cornices and frieze, brick chimneys, and multi-light wood windows.

**Figure 2. View of  
Quarters 1 looking  
southwest**  
[Treasure Island  
Museum Collection,  
Unit 1, Shelf A, Yerba  
Buena Island Folder.]



### San Francisco-Oakland Bay Bridge

Map Reference 4

The SFOBB is listed in the National Register with a period of significance of 1936, as identified on the National Register nomination form. The property is significant at the national level under Criterion A, for its important influence on transportation in San Francisco Bay Area and the state as a whole. The bridge is also significant for its engineering design (Criterion C). The SFOBB consists of fifteen contributing elements. Six contributing elements are buildings: Transbay Transit Terminal Building (San Francisco), Key System Electrical Substation (San Francisco), Key System Electrical Substation (Yerba Buena Island), SFOBB Firehouse (also known as the Caltrans Garage, Yerba Buena Island), Bay Bridge Substation (also known as the Caltrans substation, Oakland), and the Key Pier Substation (Oakland). The Firehouse and Key System Electrical Substation, which were once located within the Focused APE, have been demolished. The other nine contributing structures consist of individual components of the bridge itself: bridge approaches, San Francisco approach on- and off-ramps, street overcrossings (bus ramps in San Francisco), the main bridge spans (West and East Bay spans) and the Yerba Buena Tunnel.<sup>11</sup> Of these structures, only a short, westernmost portion of the East Bay Span (Bridge No. 33-025) is located within the Focused APE. A new East Span of the SFOBB has been under construction since 2002 and construction activity continues within the Focused APE.

#### **4.2.2. Archaeological Site CA-SFr-04/H**

The prehistoric component of CA-SFr-04/H is a well-defined shell midden site with a mortuary complex and a diversified assemblage of flaked, ground and polished stone, modified bone and shell, floral and faunal remains, and cultural features. The prehistoric component of this site was determined eligible for listing in the National Register by the SHPO in 1998. The historic component of the site, the U.S. Naval Training Station, was determined not to be a contributing element to National Register eligibility.

## **5. APPLICATION OF THE CRITERIA OF ADVERSE EFFECT**

### **5.1. Criteria of Adverse Effect**

The NHPA Section 106 regulations state that if there are historic properties in the APE which may be affected by a federal undertaking, the agency official shall assess adverse effects, if any, in accordance with the Criteria of Adverse Effect defined in 36 CFR 800.5. An "adverse effect is found when an undertaking may alter, directly or indirectly, any of the characteristics of a historic property that qualify the property for inclusion in the National Register in a manner that would diminish the integrity of the property's location, design, setting, materials, workmanship, feeling, or association." Application of the criteria of adverse effect is largely an assessment of an undertaking's impacts on the historic integrity of a historic property and how an undertaking will affect those features of a historic property that contribute to its eligibility for listing in the NRHP. Effects can be direct, indirect, and cumulative. Direct effects include physical destruction or damage. Indirect effects include the introduction of visual, auditory, or vibration

<sup>11</sup> The nine contributing structures have individually been assigned Caltrans Bridge numbers: Bridge Nos. 34-118R, 34-118L, 34-117S, 34-116F, 34-003, 34-004, 33-025, 34-119Y, 34-120Y.



impacts, as well as neglect of a historic property, or cumulative effects. Cumulative effects are the impacts of the project taken into account with known past or present projects along with foreseeable future projects. This FOE assesses whether the proposed project will have an adverse effect on historic properties located within the Focused APE.

**Table 1. Examples of Adverse Effects provided in 36 CFR 800.5(a)(2)**

<i>Adverse effects on historic properties include, but are not limited to:</i>	
(i)	Physical destruction of or damage to all or part of the property;
(ii)	Alteration of a property, including restoration, rehabilitation, repair, maintenance, stabilization, hazardous material remediation, and provision of handicapped access, that is not consistent with the Secretary's standards for the treatment of historic properties (36 CFR part 68) and applicable guidelines;
(iii)	Removal of the property from its historic location;
(iv)	Change of the character of the property's use or of physical features within the property's setting that contributes to its historic significance;
(v)	Introduction of visual, atmospheric or audible elements that diminish the integrity of the property's significant historic features;
(vi)	Neglect of a property which causes its deterioration, except where such neglect and deterioration are recognized qualities of a property of religious and cultural significance to an Indian tribe or Native Hawaiian organization; and
(vii)	Transfer, lease, or sale of property out of Federal ownership or control without adequate and legally enforceable restrictions or conditions to ensure long-term preservation of the property's historic significance. <sup>12</sup>

Of the seven types of effects listed above, 36 CFR 800.5(a)(2) (vi) and (vii) are not applicable to this project. This project would not result in the neglect of a historic property (vi) or the transfer, lease, or sale of property out of Federal ownership or control (vii).

<sup>12</sup> 36 CFR 800.5, "Assessment of adverse effects," incorporating amendments effective August 5, 2004.



## 5.2. Analysis of Effect to Historic Properties

This section assesses the effects of each project alternative on the historic properties. Because the new East Bay Span of the SFOBB is currently under construction and would lead to removal of the existing East Span structure, none of the alternatives has any potential to have an adverse effect on any components of the existing SFOBB historic property. This section, therefore, focuses upon the other three historic properties in the Focused APE which the project has a potential to affect. The assessment provided below identifies the direct, indirect, and cumulative effects as defined in 36 CFR 800.5 (a)(2). The section is arranged by Project alternative. Existing views, and renderings and simulations of both alternatives appear in Appendix B.

### 5.2.1. No-Build Alternative

The No-Build Alternative would have no effects on historic properties because it represents the existing YBI interchange condition with no project-related activities. As such, effects analysis results in no historic properties affected for this alternative, as outlined in 36 CFR 800.4(d)(1).

### 5.2.2. Alternative 2B

Project actions for this alternative would include the construction of elevated westbound on-ramp and off-ramp immediately adjacent to Quarters 1, in the Senior Officers' Quarters Historic District, and would require the relocation of Quarters 10/Building 267. In addition, under this alternative Macalla Road would be widened and a retaining wall would be constructed along the south side of the road. Please see Map 4, in Appendix A, for a plan view of Alternative 2B and the historic properties within the Focused APE. Visual Simulations and renderings of Alternative 2B illustrating the appearance of the alternative for all view points, as well as renderings, are provided in Figures 6-13, Appendix B.

Alternative 2B would result in indirect and direct adverse effects to the Senior Officers' Quarters Historic District under 36 CFR 800.5(a)(2)(i), (ii), (iv) and (v); and to Quarters 1 under 36 CFR 800.5(a)(2)(i), (iv) and (v); and to Quarters 10/Building 267 under 36 CFR 800.5(a)(2)(i), (ii), (iii), (iv) and (v).

#### Quarters 8

All construction for the on- and off-ramps for Alternative 2B would be conducted on the north side of the new SFOBB East Span. Because all construction would be more than 400 feet from Quarters 8, this alternative would not cause any direct or indirect effects to this historic property. See Map 4, Appendix A.

#### Quarters 10 (and Building 267)

Alternative 2B would cause a direct adverse effect to Quarters 10 by the removal of the property from its historic location. Under this alternative, Quarters 10 and its associated garage (Building 267) would be removed to accommodate the construction of both on- and off- ramps and an abutment along the south side of Macalla Road, see Figures 6-6a, Appendix B.

#### Senior Officers' Quarters Historic District and Quarters 1

Alternative 2B would cause a direct adverse effect to the Senior Officers' Quarters Historic District by physically destroying or damaging contributing elements and character-defining features of the district. See Figures 7-13, Appendix B. The westbound off-ramp proposed for

this alternative would be constructed directly through the southeastern boundary of the historic district. Bent W7 would be constructed immediately southeast of Quarters 1 and would remove and/or damage a portion of the district's historic landscape, including grass and border hedge of the greensward in front of Quarters 1-3, and paved driveway and curbing southeast of Quarters 1. Bent W8 would be constructed within the formal terraced garden behind Quarters 1 and would destroy much of the third level of the terrace garden. This project action could include removing or altering plantings and trees, the gradual upward slope of the land, and brick retaining walls, planters, and stairs that lead to this third garden tier. Construction activities for the westbound on-ramp under this alternative would be conducted outside of the boundaries of the historic district.

Alternative 2B may also cause an indirect adverse effect on the historic district and Quarters 1 by introducing a potential risk of damage to the historic properties significant features from construction vibration. Specific potential vibration impacts for the proposed project are unknown; however, Caltrans guidance for this type of effect is to use criteria to evaluate severity of continuous vibrations (from traffic, train and most construction vibrations). Caltrans recommends that to reduce risk of damage to ruins, ancient monuments, and historic buildings, continuous vibrations should not exceed 2.0 mm/s (0.08 in/sec).<sup>13</sup> This assessment of continuous vibrations does not address temporary vibrations from pavement breaking, pile driving, blasting, or other types of demolition or construction. Caltrans advises that if these types of activities would take place within 7.5 m (25 feet) or less from "normal" buildings, or within 15-30 meters (50-100 feet) of historic buildings or structures, damage is likely to occur.<sup>14</sup> Using this standard, there is a potential for indirect adverse effects from construction vibration to the historic district and Quarters 1. For the off-ramp structure, construction activities for Bent W7 and W8 would be approximately 4.5 meters (15 feet) and 11.5 meters (35 feet), respectively, from Quarters 1 and construction activities for Bent W9 would be located approximately 22 meters (75 feet) from Building 230. Similarly, on-ramp Bents W8 and W7 would be approximately 30 meters (100 feet) and 25 meters (82 feet), respectively, from Quarters 1 and Bents W6 and W7 would be approximately 30 meters (100 feet) from Building 230. Although Caltrans will select a pile type and construction method for bents near Quarters 1 that would minimize vibration impacts to the historic property, because the ramp structural members would be located less than 30 meters (100 feet) from Quarters 1 and Building 230, as well as the historic landscape, all of which are contribute to the historic district's significance, the project has the potential to cause damage to those buildings and structures. Quarters 1, an individual historic property, if affected by vibrations, would be adversely affected in the same way.

Alternative 2B would also cause an indirect adverse effect on the historic district by the introduction of visual or atmospheric elements that diminish the integrity of the property's significant historic features. The construction of the ramps, which would rise between approximately 55 and 100 feet above the historic district, and its structural members that would be built immediately adjacent to contributing features, would alter the view of the historic property (see Visual Simulation Nos. 3 and 4). The size, scale, and massing of such a structure is not consistent with historic design, setting, location, feeling, or setting of the historic district and

<sup>13</sup> Rudy Hendricks, Caltrans Technical Advisory, Vibration, TAV-02-01-R9601, "Transportation Related Earthborne Vibrations," February 20, 2002, p10-11; URS, et al., "Noise & Vibration Study, SFOBB East Span Seismic Safety Project," September 21, 1998.

<sup>14</sup> Hendricks, Caltrans Technical Advisory, "Transportation Related Earthborne Vibrations," February 20, 2002, 18.



would diminish the historic integrity of the historic property. Additionally, because the on- and off-ramps would be elevated above the historic district, this alternative has the potential to cause new shade and shadows in those areas beneath and adjacent to the new ramp structures. This would include Quarters 1 and its adjacent planting beds, the formal terraced garden behind Quarters 1, and the greensward. This potential new shade may cause damage to, or alter the plantings, and may alter the use of the historic landscape areas, diminishing the integrity of these contributing features.

#### Archaeological Site CA-SFr-04/H

A prehistoric site, CA-SFr-04/H is located within the APE. No column footings are proposed within or near CA-SFr-04/H for Alternative 2b. However, an ESA will be established for this site using "G" markers to establish visual indicators in the field. This will allow for equipment movement and storage, but no ground-disturbing activities, i.e. post holes, fencing, etc. Therefore, there will be a no adverse effect with standard conditions.

### **5.2.3. Alternative 4**

Project activities for this alternative would include the construction of elevated westbound on-ramp and off-ramps, widening of Macalla Road and the construction of a retaining wall along the south side of Macalla Road. Please see Map 5, in Appendix A, for a plan view of Alternative 4 and the historic properties within the Focused APE. Visual Simulations and renderings of Alternative 4 illustrating the appearance of the alternatives for all view points are provided in Figures 14-21, Appendix B.

Alternative 4 would result in indirect adverse effects to Quarters 10; the Senior Officers' Quarters Historic District under 36 CFR 800.5(a)(2)(iv) and (v); and Quarters 1 under 36 CFR 800.5(a)(2)(iv) and (v).

#### Quarters 8

Alternative 4 would not cause any adverse effects to Quarters 8. The project proposes the construction of the westbound on-ramp in the immediate vicinity of this historic property. The entrance to the on-ramp would be located approximately 40 meters (131 feet) east of the historic property and would parallel (to the south) the eastbound on-ramp for the new SFOBB East Span project. See Map 5, Appendix A. The on-ramp would begin at grade and gently slope downward before it turned northward under the new SFOBB. This proposed alternative would not cause any direct effects Quarters 8 because it would not alter any of its character-defining features, nor would it diminish its historic integrity.

Alternative 4 would not cause any indirect effects from its construction. Construction activities would be more than 30 meters (100 feet) from the property, thus no damage to the historic structure from construction vibration is anticipated. While the new ramp would introduce a new visual element to the property, it would not diminish the historic integrity of the property because the new ramp would slope away from Quarters 8; therefore only a portion of the deck would be visible from the historic property. Furthermore, the viewshed (looking east) from Quarters 8 would not materially change from the existing conditions (before the proposed alternative's construction) or after the construction of the new SFOBB East Span project and its eastbound on-ramp.



### Quarters 10 (and Building 267)

Alternative 4 would not cause any direct adverse effects to the Quarters 10 (and Building 267) because all construction actions for the on- and off-ramps would be conducted at a distance greater than approximately 20 meters (65 feet) from the boundary of the historic property. See Figures 14–14b, Appendix B. All widening activity of Macalla Road (including the construction of a retaining wall) would be restricted to the south side of the road and at a distance of more than 6 meters (20 feet) from the historic property boundary. Neither the ramps nor the widening of Macalla Road would cause any damage or alteration to the physical features that contribute to the property's significance, nor would it materially change the property's use or setting.

Alternative 4 may cause an indirect adverse effect Quarters 10 and Building 267 by potentially causing damage to the historic properties' significant features through construction vibration. Caltrans advises that construction activities, such as pavement breaking or extensive pile driving, within 15–30 meters (50–100 feet) of historic buildings or structures would likely cause damage to such buildings.<sup>15</sup> Because construction to widen the transition structure for the on-ramp would be approximately 25 meters (82 feet) from Building 267, it would have potential to damage that historic property and/or damage hardscape features (driveway, concrete planters, retaining wall, etc.) within the property boundary. There would be no anticipated indirect adverse effects to this historic property from the introduction of new visual elements. The historic property is generally surrounded on all sides by dense shrubs and trees which would block the view of the on- and off-ramps when looking north from the historic property. While the widening of the transition structure for the on-ramp and Macalla Road retaining wall would be visible from Building 267, there would be relatively little change to the view looking east and south, respectively.

### Senior Officers' Quarters Historic District and Quarters 1

Alternative 4 would not cause any direct adverse effects to the Senior Officers' Quarters Historic District or Quarters 1 because all construction activity for the ramp structures would be conducted outside of the historic district boundary. See Figures 15-21, Appendix B. The project would not cause any damage or alteration to the physical features that contribute to the property's significance, nor would it change the property's use or setting.

Alternative 4 may cause an indirect adverse effect on the historic district and Quarters 1 by causing potential damage to the historic properties' significant features through construction vibration. For the off-ramp structure, Bent 1 would be constructed approximately 20 meters (65 feet) southeast of Quarters 1. Although Caltrans will select a pile type and construction method for bents near Quarters 1 that would minimize vibration impacts to the historic property, potential construction activities that may occur in this area (pavement breaking or extensive pile driving) has the potential to cause damage to historic buildings or structures.

Alternative 4 would also cause an indirect adverse effect on the historic district by the introduction of visual elements that diminish the integrity of the property's significant historic features. The on-ramp structure would extend northwest approximately 20 meters (65 feet) from the new east span of SFOBB at Bent 2 (which is located just outside the historic district's eastern boundary). It would be 30 meters (131 feet) wide at its widest location (near Bent 4) and would be elevated approximately 10 meters (32 feet) above Quarters 1 and approximately 150 feet above the greensward. The size, scale, and massing of such a structure is not consistent with

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<sup>15</sup> Hendricks, Caltrans Technical Advisory, "Transportation Related Earthborne Vibrations," February 20, 2002, 18.

historic design, setting, location, feeling or setting, of Quarters 1 or the historic district and would constitute introduction of a new visual element.

Additionally, the ramp deck and bents would obstruct eastward view from Quarters 1 and because the view from this building is a character-defining feature, Alternative 4 would diminish the integrity of Quarters 1. The introduction of the ramp structures would thus cause an adverse effect to both the district and Quarters 1. Although the viewshed from Quarters 2 would be somewhat altered by the proposed ramps, it would not do so in an adverse manner as the view from this building is mostly obstructed by the row of eucalyptus trees that provide the eastern border to the historic property. Similarly, Quarters 3–5 would not be adversely affected because the new ramps would not be visible from these buildings.

#### Archaeological Site CA-SFr-04/H

A prehistoric site, CA-SFr-04/H is located within the APE. No column footings are proposed within or near CA-SFr-04/H for Alternative 4. However, an ESA will be established for this site resulting in a no adverse effect with standard conditions.

#### **5.2.4. Noise Effects**

The noise levels of the proposed Alternative 2B are expected to be approximately 68 dBA  $L_{eq}$  at the Nimitz House (Quarters 1), within the District.<sup>16</sup> This is a level of change from the existing baseline that may be detectable to the human ear in an exterior setting. This change represents an approximately 2 dBA reduction in noise levels and is not expected to further impair integrity of the setting of the building or District, which has experienced high levels of traffic noise since the original SFOBB was constructed in the 1930s. The proposed Alternative 2B, therefore, would not cause an indirect adverse effect on the District or its contributors because it would not introduce auditory elements that would diminish the integrity of the property (36 CFR 800.5[a][2][v]).

The noise levels of the proposed Alternative 4 are expected to be approximately 68 dBA  $L_{eq}$  at the Nimitz House (Quarters 1) within the District, and approximately 72 dBA  $L_{eq}$  at the Quarters 10 / Building 267 property.<sup>17</sup> The level of change from the existing baseline at Quarters 10 / Building 267 may be detectable to the human ear in an exterior setting, however, the SFOBB had already been in place for about a decade when Quarters 10 and Building 267 were built and the bridge and traffic noise have always been a part of the setting of this property. The proposed Alternative 4 would not cause an indirect adverse effect on either the District or the Quarters 10 / Building 267 property because it would not introduce auditory elements that would diminish their integrity (36 CFR 800.5[a][2][v]).

#### **5.2.5. Cumulative Effects**

Construction of either of the build alternatives for this project would not cause adverse cumulative effects to the historic properties within the Focused APE. Cumulative effects analysis takes into consideration that “adverse effects may include reasonably foreseeable effects

<sup>16</sup> EDAW-AECOM, “Draft Noise Study Report, Yerba Buena Island Ramps Improvement Project, San Francisco, California, 04-SF-80, PM 12.3-13.2/7.6-8.1, EA 04-3A64OK,” August 2009. Quarters 1 was evaluated as Receiver 2, at 69 dBA, land use category C (commercial).

<sup>17</sup> EDAW-AECOM, “Draft Noise Study Report. Quarters 10 has predicted noise level of 72dBA, data provided via personal communication, from Bill Maddux, EDAW-AECOM, August 12, 2009.



caused by the undertaking that may occur later in time, be farther removed in distance, or be cumulative" (36 CFR 800.5 (a)(1)). Previous projects in the vicinity of the Focused APE, specifically the SFOBB East Span Seismic Safety Project (currently underway), have been subject to Section 106 effects analysis and CEQA impacts analysis. The SFOBB East Span project includes removal of a portion of the SFOBB and construction of a new East Bay span. Adverse effects to historic properties and their character-defining features identified for that project, including the removal of the East Span structures, the Caltrans Garage, and the Yerba Buena Electrical Substation.<sup>18</sup> Caltrans, SHPO and ACHP developed a memorandum of agreement (MOA) to mitigate these effects.<sup>19</sup> The construction of the SFOBB East Span project, when considered in conjunction with the YBI Ramps Project, would not adversely affect the other historic properties in the Focused APE for this project. The SFOBB East Span project would not cause an adverse cumulative effect.

No reasonably foreseeable adverse effects of future projects have been identified. Projects in the planning process include:

1. Transfer of YBI and Treasure Island (TI) from the US Navy to the City and County of San Francisco (CCSF), and the redevelopment of TI/YBI. CCSF and the US Navy have been negotiating the transfer of the property for several years. The US Navy has prepared environmental compliance documents regarding historic properties to meet its responsibilities under Section 106 and Section 110 of the NHPA.<sup>20</sup> It is assumed that the transfer of TI/YBI will provide for the treatment of historic properties in a manner that is consistent with the Secretary of the Interior's Standards for the Treatment of Historic Properties (36 CFR part 68).
2. In December of 2006, the San Francisco Board of Supervisors and Treasure Island Development Authority (TIDA) endorsed a Development Plan for the redevelopment of TI/YBI.<sup>21</sup> The plan generally provides for the restoration and reuse of historic buildings structures, and the Senior Officers' Quarters Historic District has been identified as a potentially commercial and cultural mixed-use area. It is assumed that the Development Plan would be executed in a manner consistent with the Secretary of the Interior's *Standards for the Treatment of Historic Properties* (36 CFR part 68).
3. San Francisco Bay Plan, by the San Francisco Bay Conservation and Development Commission. It is assumed that this plan will be executed in a manner consistent with the Secretary of the Interior's Standards for the Treatment of Historic Properties (36 CFR part 68). BCDC San Francisco Bay Plan presents the following policies for TI and/or YBI:

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<sup>18</sup> Caltrans District 4, "Finding of Adverse Effect: Buildings and Structures, San Francisco-Oakland Bay Bridge East Span Seismic Safety Project, EA 012000," September 1998; Caltrans District 4, "Addendum Finding of Adverse Effect, San Francisco-Oakland Bay Bridge East Span Seismic Safety Project, EA 012000," October 1999.

<sup>19</sup> "Memorandum of Agreement among the FHWA, the US Coast Guard, the California SHPO, and the ACHP for the San Francisco Oakland Bay Bridge East Span Seismic Safety Project ...," May 2000.

<sup>20</sup> "Memorandum of Agreement between the Department of the Navy and the California State Historic Preservation Officer for the Layaway, Caretaker Maintenance, Interim Leasing, Sale, Transfer, and Disposal of Historic Properties on the Former Naval Station Treasure Island, San Francisco, California," June 2003.

<sup>21</sup> Treasure Island Development Authority, "Transfer and Redevelopment of former Naval Station Treasure Island," accessed May 17, 2009 at [http://www.sfgov.org/site/treasureisland\\_page.asp?id=96594](http://www.sfgov.org/site/treasureisland_page.asp?id=96594), ©2000-2009.



- **Yerba Buena Island - South of Bay Bridge** – redevelopment for recreational use.
- **Yerba Buena and Treasure Islands – Clipper Cove** – shoreline improvements.
- **Yerba Buena Island North of Bay Bridge** – public open space development.
- **Treasure Island Redevelopment.**<sup>22</sup>

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<sup>22</sup> BCDC, "San Francisco Bay Plan, Amended September 2006, Reprinted January 2007," accessed online on May 17, 2009 at [http://www.bcdc.ca.gov/pdf/planning/plans/bayplan/Plan\\_Map\\_5.pdf](http://www.bcdc.ca.gov/pdf/planning/plans/bayplan/Plan_Map_5.pdf).

## 6. ALTERNATIVES CONSIDERED BUT REJECTED

CEQA Guidelines Section 15126.6 requires the lead agency to identify the alternatives that were considered but rejected, and to briefly explain the reasons why the lead agency found them to be infeasible.<sup>23</sup> A Conceptual Feasibility Report for the YBI interchange was prepared in March 2002. The project development team, in close cooperation with Caltrans, evaluated the alternatives identified in this report and used them to develop nine build alternatives and one no-build alternative.

Stakeholders were invited to several meetings with the project development team to provide their input on the design alternatives. During these meetings, the alternatives were discussed in detail, including any non-standard features of the design. A decision matrix was presented, and the stakeholders were asked to designate a high, medium, or low rating for each alternative based on their respective interests. The results were tabulated and used to compare the alternatives.

The Project Study Report (PSR), prepared by SFCTA in December 2007, summarized the results of the alternatives evaluation. The PSR recommended that two of the alternatives, Alternatives 2B and 4, be carried forward. The remaining six build alternatives were determined to be non-viable and were eliminated from further study. These alternatives and the reasons for their elimination are discussed below.

The range of alternatives discussed in the PSR was limited to the design and reconstruction of the ramps on the east side of the YBI tunnel. The ramps west of the YBI tunnel have not been considered for reconstruction because the space available is insufficient to provide enough room for the ramps to be designed and reconstructed to meet current geometric standards.

### 6.1. Non-Viable Alternatives

#### 6.1.1. Alternative 1

This alternative proposes to design and reconstruct two of the six existing on- and off-ramps at the I-80/YBI interchange. All of the on- and off-ramps proposed would provide a single traffic lane with standard shoulder widths, as well as the following features:

- Eastbound off-ramp on the east side of Yerba Buena Island – This ramp would diverge from the West Tie-in structure, loop left under the Transition Structure and terminate in a “T” intersection at Macalla Road.
- Eastbound on- ramp on the east side of Yerba Buena Island – This ramp would begin at Hillcrest Road, curve left and climb to merge with the Transition Structure.
- Westbound on- ramp on the east side of Yerba Buena Island – This ramp would begin in a “T” intersection at Hillcrest Road, parallel the Eastbound on-ramp, loop left under the Transition structure near its east end, cross over both the westbound on- and off-ramps, and merge with the West Tie-in structure.
- Westbound off-ramp on the east side of Yerba Buena Island – This ramp would diverge from the Transition Structure near its eastern end, cross over the westbound onramp,

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<sup>23</sup> This section was prepared by EDAW/AECOM.

cross under the westbound on-ramp, curve right, then terminate in a “T” intersection at Macalla Road.

This alternative was removed from consideration for the following reasons:

- The eastbound and westbound off-ramps are isolated off-ramps, terminating at the same location at Macalla Road. This is an uncommon situation which would possibly create driver confusion resulting in potential wrong way movements from Macalla Road onto the ramps. In addition, the added vehicle volumes from both off-ramps at the intersection would negatively impact traffic operations on Macalla Road and YBI.
- The hook-shaped eastbound off-ramp is undesirable for traffic safety reasons.
- The westbound on-ramp would cause additional environmental impacts to the BCDC 100’ shoreline band and would impair accessibility to the U.S. Coast Guard property at the south side of the SFOBB.
- The westbound off-ramp would need to span over structures within the historic district creating additional environmental impacts, risk, and construction cost.
- The multiple weaving of structures under and over other structures creates additional risk and construction cost.
- The eastbound and westbound off-ramps would adversely affect the Nimitz House, a historic building north of the SFOBB. The Nimitz House would need to be relocated.

#### **6.1.2. Alternative 1A**

This alternative is similar to Alternative 1 except for the following:

- Eastbound off-ramp on the east side of Yerba Buena Island – In this alternative the ramp would loop under the Transition Structure farther east and terminate in a “T” intersection at Macalla Road south of the termination location of Alternative 1.
- Eastbound on-ramp on the east side of Yerba Buena Island – This ramp would begin at Hillcrest Road south of the location of Alternative 1, curve left, cross over the eastbound off-ramp, and merge with the Transition Structure.
- Westbound on-ramp on the east side of Yerba Buena Island – This ramp would begin in a “T” intersection at Hillcrest Road, travel east, loop left under the Transition Structure near its east end, cross over both the westbound on- and off-ramps, and merge with the West Tie-in structure.
- Westbound off-ramp on the east side of Yerba Buena Island – This ramp would diverge from the Transition Structure near its eastern end, curve right and terminate in a “T” intersection at Macalla Road. This ramp would terminate at Macalla Road south of the termination location of Alternative 1.

This alternative would provide several benefits over Alternative 1. It would require less aerial easement, would avoid direct impact on the Nimitz House, and would eliminate the isolated ramps scenario. However, this alternative would still impair accessibility to the USCG facilities in a manner similar to Alternative 1.



This alternative was removed from consideration because:

- The eastbound off-ramp would disturb the archeologically sensitive area underneath the future SFOBB.
- The hook shape eastbound off-ramp is undesirable for traffic safety reasons.
- The terminus of the westbound off-ramp and eastbound off-ramp at similar locations on Macalla Road would negatively impact the traffic operations of the road and YBI.
- The westbound on-ramp would cause additional environmental impacts to the BCDC 100' shoreline band and would impair accessibility to the US Coast Guard property at the south side of the SFOBB.
- The multiple weaving of structures under and over other structures creates additional risk and construction cost.

### 6.1.3. Alternative 2

This alternative is similar to Alternative 1A except for the following:

- Eastbound on-ramp on the east side of Yerba Buena Island – The ramp in this alternative would merge with the Transition Structure west of the merge location of the ramp in Alternative 1, resulting in a shorter ramp length.
- Westbound on-ramp on the east side of Yerba Buena Island – This ramp would begin in a "T" intersection at Macalla Road, travel east, loop right, cross over the eastbound off-ramp, and merge with the Transition Structure.
- Westbound off-ramp on the east side of Yerba Buena Island – This ramp would diverge from the Transition Structure near its eastern end, curve right, merge with the westbound on-ramp, and terminate in a "T" intersection at Macalla Road.

This alternative would elevate the westbound on- and off-ramps through the historic district and may adversely affect the historic district. It would require additional right-of-way north of the existing SFOBB mainline. This alternative would require an aerial easement for the eastbound off-ramp, but would have minimal impact to USCG operations since most of the work and modification would occur outside the USCG property.

This alternative was removed from consideration because:

- The multiple weaving of structures under and over other structures creates additional risk and construction cost.
- The hook shape off-ramp is undesirable for traffic safety reasons.
- The westbound on-ramp and off-ramp would have adverse effects on the Nimitz House and the other historical buildings.
- The westbound on and off-ramps would need to span over structures within the historic district creating additional environmental impacts, risk, and construction cost.

#### **6.1.4. Alternative 2A**

This alternative is similar to Alternative 2 except for the following:

- Eastbound off-ramp on the east side of Yerba Buena Island – This ramp would diverge from the West Tie-in structure, hook right, and terminate at Hillcrest Road.
- Eastbound on-ramp on the east side of Yerba Buena Island – This ramp would begin at Hillcrest Road, curve right and merge with the Transition Structure.

This alternative would elevate the westbound on- and off-ramps through the historic district and may have an environmental impact on the historic district. It would require additional right-of-way north of the existing SFOBB mainline. This alternative would have minimal impact to USCG operations, since most of the work and modification would occur outside of the USCG property.

This alternative was removed from consideration because:

- The westbound on and off-ramps would need to span over structures within the historic district creating additional environmental impacts, risk, and construction cost.
- The westbound on-ramp and off-ramp would adversely affect the historic buildings adjacent to the Nimitz House.
- The westbound on-ramp and off-ramp would adversely affect the other historical buildings adjacent to the SFOBB.
- The location of the westbound off-ramp join with the mainline would negatively affect the seismic design and potentially cause added stress to the SAS structure.

#### **6.1.5. Alternative 3**

This alternative is similar to Alternative 2 except for the following:

- Eastbound off-ramp on the east side of Yerba Buena Island – This ramp would diverge from the West Tie-in structure, loop right over the USCG property, and terminate at a “T” intersection at Hillcrest Road.
- Eastbound on-ramp on the east side of Yerba Buena Island – This ramp would begin at Hillcrest Road south of the ramp location in Alternative 2.
- Westbound on-ramp on the east side of Yerba Buena Island – This ramp would begin at a “T” intersection at Macalla Road, merge with the westbound off-ramp, curve right near the shoreline, travel over the western side of the historic district, diverge from the westbound off-ramp, curve left and merge with the Transition Structure.
- Westbound off-ramp on the east side of Yerba Buena Island – This ramp would diverge from the West Tie-in structure, curve left, merge with the westbound off-ramp, travel over the west side of the historic district property, curve left near the shoreline, then terminate at a “T” intersection at Macalla Road.
- The eastbound on-ramp would be reconfigured to allow vertical clearance under the eastbound off-ramp.

This alternative was removed from consideration because:

- The westbound off and on-ramp would cause additional environmental impacts to the BCDC 100' shoreline band.
- The eastbound off-ramp would cause significant impacts to the US Coast Guard facility with the structure spanning over their property.
- It would result in adverse impacts to biological resources north of I-80.
- The eastbound on-ramp would encroach into an archaeologically sensitive area.
- The length of the structures required to go around the historic district would increase construction cost significantly.
- It would adversely affect the Nimitz House and the other historical buildings.

#### **6.1.6. Alternative 5**

This alternative proposes a standard tight diamond intersection with minimal nonstandard design features and would have minor impacts on USCG access and operations. However, this alternative would require excavating and daylighting the existing YBI tunnel to allow for the construction of the westbound on-ramp and eastbound off-ramp.

This alternative was removed from consideration because the approximate cost to modify the existing YBI tunnel is between \$500 million and \$1 billion, which is substantially higher than the estimated costs for the other build alternatives.



## **7. PROPOSED MITIGATION**

As discussed in Section 6, both project build alternatives would have an adverse effect on historic properties. The SFCTA, in conjunction with Caltrans and FHWA, is continuing consultation with SHPO following 36 CRF 800.6, to arrive at resolution of the adverse effect(s). Caltrans, in accordance with Stipulation XI of the Section 106 PA, will prepare a draft Memorandum of Agreement (MOA) to memorialize measures that would mitigate adverse effects. The MOA signatory parties will be Caltrans, SHPO, and the Advisory Council on Historic Preservation (ACHP), should the ACHP decide to participate. SFCTA, the US Navy, TIDA, and others are anticipated to be concurring parties.

SFCTA sent a letter to interested parties on December 11, 2008, notifying interested individuals and organizations that the project is anticipated to have an adverse effect on these properties and to solicit the input of these parties (Appendix C). No responses to this letter have been received to date; however, any responses will be appended to this document and included in the environmental document if any are forthcoming. Revisions to proposed mitigation measures resulting from these responses will also be incorporated in the development of MOA stipulations if received prior to execution of the MOA.

### **7.1. Efforts to Avoid or Minimize Adverse Effects**

The alternatives development evaluation process described in the previous section includes efforts to develop alternatives that could avoid and/or minimize adverse effects to the District, Quarters 10/267, and Quarters 8. The main design constraint for Alternative 2B was the difficult topography, as well as the existing roadway geometrics and historic buildings in the vicinity of the intersection of Alternative 2B and Macalla Road. Alternative 4, therefore, was developed in order to identify a way to construct the ramps without directly affecting the historic properties; however, Alternative 4 causes its own indirect adverse effects (see Section 5), and the alternative development process did not identify any other feasible alternatives that could completely avoid adverse effects to historic properties within the Focused APE (see Section 6).

### **7.2. Proposed Mitigation Measures**

Caltrans will prepare a draft Memorandum of Agreement (MOA) for the project in coordination with the project proponent and Office of Historic Preservation (OHP). The MOA will stipulate various mitigation activities that will be conducted to address adverse effects that the proposed build alternatives would have on historic properties as presented in Section 5. The goal of the mitigation under development for the YBI Ramps project is to add to and compliment both previous and on-going mitigation measures being undertaken as part of the East Span project. Caltrans will ensure that SFCTA carries out these measures, insuring that: a) the historic properties are properly recorded through photography, written documentation, and/or educational/interpretive material; b) that this material is appropriately distributed; and c) that historic properties within the Focused APE are protected and monitored before and during construction. SFCTA will not authorize project-related activities that could result in an adverse effect to the historic property until these stipulations are completed. Mitigation measures proposed for the project include the following:

Relocation of Historic Structures. Alternative 2B would require the removal of Quarters 10 and Building 267. To help minimize the adverse effect of the removal, if Alternative 2B is chosen as the Preferred Alternative, the two buildings would be relocated prior to construction of the ramps at Macalla Road. Two potential relocation sites, both within the general vicinity of the original location of the property on the east side of Yerba Buena Island, are being developed. The relocation of the buildings will take into account the site layout (i.e., the orientation of the buildings to the cardinal directions and proximity to a hillside), as well as their potential reuse. As part of this effort, SFCTA is coordinating with Caltrans, SHPO, and JRP consulting architectural historians, as well as the current and future land-owning agencies: the U.S. Navy and the City and County of San Francisco. Quarters 10/Building 267 will be thoroughly recorded in a Historic Structure Report (see below), and the relocation plan will provide for project and stabilization of the building before, during, and after the move.

Screening. A planting plan could be designed to help provide visual screening between the new ramp structures and the historic properties. OHP has indicated that they would support this potential mitigation measure and SHPO has requested that illustrations of how landscaping around the Nimitz House would look over a period of time as it matured. This mitigation will be coordinated with the land-owning agencies and Caltrans prior to the start of construction to ensure that the YBI Ramps project screening plan takes into account similar landscaping mitigation projects underway for properties within the Focused APE.

Interpretive signs. Signs that incorporate narrative historic context and images could be established along the new multipurpose pathway component of the project. The signs could utilize photographs of the historic district, Quarters 10 / Building 267, as well as views from the historic properties or views from the pathway. These images could include both before and after construction of the original SFOBB and before the construction of the new ramps. The signs could also utilize historical data from HABS or HSR documentation of the properties within the Focused APE for this project.

NRHP Nomination. Quarters 8 was determined eligible for listing in the NRHP, and as part of the mitigation for the current project, SFCTA will complete and submit a nomination for Quarters 8, to the NRHP Program at the National Park Service. The photographs used in the nomination will be made prior to the start of construction; however, the nomination document may also use current and/or historic images prepared as part of other mitigation activities.

Historic American Buildings Survey (HABS) Documentation. The District and Quarters 10/Building 267 have already been the subject of HABS recordation, therefore recordation conducted as mitigation for this project will be designed to augment the previous work through HABS recordation of Quarters 8. Prior to the start of construction, large-format (four by five inch, or larger, negative size) black and white photographs will be taken showing Quarters 8 in context, as well as details of its character-defining features. The views will specifically include views of and from the building, both towards and away from the SFOBB structures. The photographs will be processed for archival permanence in accordance with HABS photographic specifications. Each view will be fully captioned, and if necessary, perspective corrected. Oblique aerial photography will be considered as a photographic recordation option in these coordination efforts.

The recordation will follow the National Park Service HABS Guidelines and the report format, views, and other documentation details will be coordinated with the Western Regional Office of



the NPS, Oakland, CA. It is anticipated that the recordation of Quarters 8 will be completed to Level I or Level II HABS written data standards, and will include archival and digital reproduction of historic images, plans, and drawings. Copies of the documentation will be offered to the San Francisco Public Library, Oakland Museum of California, Environmental Design Archives (U.C. Berkeley), Caltrans District 4 Office of Cultural Resource Studies, and the Caltrans Transportation Library and History Center at Caltrans Headquarters in Sacramento. The documentation will also be offered in printed and electronic form to any repository or organization upon which SFCTA, Caltrans, and SHPO, through consultation, may agree. The electronic copy of the report could be placed on an agency or organization's web site.

Historic Structure Report (HSR). Prior to the start of construction, SFCTA will prepare HSRs for the contributing elements of the District and for Quarters 10/Building 267. The HSRs will follow the general guidelines for such reports and as described in the OHP publication, "Historic Structure Report Format," [http://ohp.parks.ca.gov/?page\\_id=1069](http://ohp.parks.ca.gov/?page_id=1069). The scope of the HSRs will be developed in consultation with Caltrans, OHP, and the landowning agencies, and copies of the reports will be provided to the same. The HSR for Quarters 10/Building 267 will include documentation of the properties existing landscaping. The landscape elements of the District, will be documented in a Historic Landscape Report, described below. Caltrans will provide copies of photographs and/or plans prepared as part of previous mitigation activities at these buildings for use in the HSRs. The HSRs will be used in the on-going planning process and reuse of the properties.

Historic Landscape Report (HLR). Prior to the start of construction, SFCTA will prepare an HLR for the contributing landscape elements of the District. The HLR will be informed by the general guidelines for the Historic American Landscape Survey (HALS), as described in the NPS online publication, "HALS Guidelines," <http://www.nps.gov/hdp/standards/halsguidelines.htm>. The scope of the HLR will be developed in consultation with Caltrans, OHP, and the landowning agencies, and copies of the reports will be provided to the same. Caltrans will provide copies of photographs and/or plans prepared as part of previous mitigation activities within the district that may be relevant to the contributing landscape elements. The HLR documentation will be used in the on-going planning for and reuse of the District.

Protection and Stabilization. SFCTA and Caltrans, prior to the start of construction and in consultation with the land-owning agencies, will develop and implement measures to protect the Nimitz House (Quarters 1) from damage by any aspect of the project. Such measures will include, but not necessarily be limited to, vibration monitoring during pile driving or general construction of the pier structures in the vicinity of this building. If Alternative 4 is selected as the Preferred Alternative, SFCTA and Caltrans, prior to the start of construction and in consultation with the land-owning agencies, will develop and implement measures to protect Quarters 10/Building 267 from damage by any aspect of the project. If Alternative 2B is selected as the Preferred Alternative, such measures will include, but are not limited to, stabilization of the buildings before, during, and after relocation, as well as protection during storage at the new site and during its subsequent rehabilitation. In addition, although historic-era site P-38-04322 is currently situated outside the Area of Direct Impact construction activities could inadvertently disturb or destroy portions of the is feature that is presently listed on the CRHR. In order to reduce chances that this feature could be inadvertently damaged during Project construction activities, it should be clearly delineated using orange "cyclone" fencing or other similar suitable materials and designated as a restricted area within which no ground-



disturbing activities could occur. The protective and stabilization measures will be included in the contract specifications.

Repair of Inadvertent Damage. SFCTA will ensure that any damage to any of the historic properties within the Focused APE resulting from the project will be repaired in accordance with the Secretary of the Interior's *Standards for Rehabilitation*. The HSR, HLR, and/or HABS recordation will photographically document the condition of the buildings prior to the start of construction to establish the baseline condition for assessing damage. A copy of this photographic documentation will be provided to Caltrans and the land-owning agencies. Prior to implementation, SFCTA shall provide the plans for any repairs to Caltrans and SHPO for review and comment to ensure conformance with the Secretary of the Interior's *Standards for Rehabilitation*.

Environmental Sensitive Area. An ESA will be established for CA-SFr-04/H (ESA 1a and 1b) to insure that no ground-disturbing activities take place within the boundaries of the site.

## 8. CONCLUSIONS

Caltrans finds that there are historic properties affected by the Project pursuant to Section 106 PA Stipulation IX.B. Caltrans proposes that the undertaking will have an Adverse Effect for the Senior Officers' Quarters Historic District, Quarters 1 and Quarters 10 (including Building 267). Caltrans is consulting to resolve adverse effects pursuant to Section 160 PA Stipulation XI, 36 CFR 800.6(a) and 800.6(b)(1). At this time, this document serves only to obtain SHPO concurrence that the undertaking will have an Adverse Effect on a historic property and that mitigation measures will be discussed in a separate consultation document along with a draft MOA.

**Table 2. Summary Effect Table**

<b>Historic Property</b>	<b>Alternative 2B Effects (see Section 5.2.2)</b>	<b>Alternative 4 Effects (see Section 5.2.3)</b>
Quarters 8	No Effect	No Effect
Quarters 10 (and Building 267)	<b>Adverse</b> - Direct	<b>Adverse</b> - Indirect
Senior Officers' Quarters Historic District (including Quarters 1)	<b>Adverse</b> - Direct & Indirect	<b>Adverse</b> - Indirect
CA-SFr-04/H	No Adverse Effect with Standard Conditions	No Adverse Effect with Standard Conditions
SFOBB	No Effect	No Effect

## 9. REFERENCES

- BCDC. "San Francisco Bay Plan, Amended September 2006, Reprinted January 2007." As of May 17, 2009. [http://www.bcdc.ca.gov/pdf/planning/plans/bayplan/Plan\\_Map\\_5.pdf](http://www.bcdc.ca.gov/pdf/planning/plans/bayplan/Plan_Map_5.pdf).
- Caltrans District 4. "Addendum Finding of Adverse Effect, San Francisco-Oakland Bay Bridge East Span Seismic Safety Project, EA 012000." October 1999.
- Caltrans District 4. "Finding of Adverse Effect: Buildings and Structures, San Francisco-Oakland Bay Bridge East Span Seismic Safety Project, EA 012000." September 1998.
- EDAW / AECOM. "Draft Noise Study Report, Yerba Buena Island Ramps Improvement Project, San Francisco, California, 04-SF-80, PM 12.3-13.2/7.6-8.1, EA 04-3A64OK," August 2009.
- HABS No. CA-233-A.
- HABS No. CA-1793-A through M.
- Hendricks, Rudy. Caltrans Technical Advisory, Vibration, TAV-02-01-R9601, "Transportation Related Earthborne Vibrations (Caltrans Experiences)." February 20, 2002.
- "Memorandum of Agreement among the Federal Highway Administration, the United States Coast Guard, the California State Historic Preservation Officer, and the Advisory Council on Historic Preservation for the San Francisco Oakland Bay Bridge East Span Seismic Safety Project in San Francisco and Alameda Counties, California." May 2000.
- "Memorandum of Agreement between the Department of the Navy and the California State Historic Preservation Officer for the Layaway, Caretaker Maintenance, Interim Leasing, Sale, Transfer, and Disposal of Historic Properties on the Former Naval Station Treasure Island, San Francisco, California." June 2003.
- Treasure Island Development Authority. "Transfer and redevelopment of former Naval Station Treasure Island," [http://www.sfgov.org/site/treasureisland\\_page.asp?id=96594](http://www.sfgov.org/site/treasureisland_page.asp?id=96594). Accessed May 17, 2009.
- URS / Greiner / Woodward-Clyde. "Noise & Vibration Study, San Francisco – Oakland Bay Bridge East Span Seismic Safety Project, Caltrans 04A0148, EA 012000," September 21, 1998.



## 10. PREPARERS' QUALIFICATIONS

This document was conducted under the general direction of Rebecca M. Bunse (M.A. in Public History, California State University, Sacramento), a partner at JRP with more than nineteen years experience conducting these types of studies. Ms. Bunse consulted on the development of the APE, provided overall effects analysis guidance, and edited the report. Based on her level of experience and education, Ms. Bunse qualifies as a historian/architectural historian under the Secretary of the Interior's Professional Qualification Standards (as defined in 36 CFR Part 61).

JRP architectural historian Toni Webb was the lead historian for this project. Ms. Webb prepared the contextual statement and evaluations, as well as conducted fieldwork, prepared updated DPR forms, and conducted effects analysis. Ms. Webb received a B.F.A. in Historic Preservation from the Savannah College of Art & Design and has more than ten years of experience in public history and historic preservation. Based on her level of experience and education, Ms. Webb qualifies as an architectural historian under the Secretary of the Interior's Professional Qualification Standards (as defined in 36 CFR Part 61).

EDAW Senior Archaeologist Brian Ludwig (Ph.D. anthropology/archaeology, Rutgers University) meets the Secretary of the Interior's Qualification Standards and has more than twenty-seven years experience in academic and Cultural Resources Management fields. Dr. Ludwig participated in the development of the Archaeological APE for the Project and directed the archaeological investigations.

**Appendix A**  
**Maps**









Area of Potential Effects

1 inch equals 2,000 feet

0 0.5 1 Miles

01-09





Historic Architectural Focused Area of Potential Effect  
Alternative 2b

Yerba Buena Island  
Ramps Improvement Project



**Alternative 2b Proposed Ramps**

- Proposed West Bound Off-Ramp
- Proposed West Bound On-Ramp
- Proposed Macalla Road Improvements

Area of Potential Effect

**Separate Project Currently Under Construction**

- San Francisco-Oakland Bay Bridge  
East Span Seismic Safety Project
- Transition Structure Portion of SFOBB

**# Map Reference**

0 100 200 300 Feet

Map 3. Focused APE

Historic Architectural Focused Area of Potential Effect  
Alternative 4

Yerba Buena Island  
Ramps Improvement Project



**Alternative 4 Proposed Ramps**

- Proposed West Bound Off-Ramp
- Proposed West Bound On-Ramp
- Proposed Macalla Road Improvements

Area of Potential Effect

**Separate Project Currently Under Construction**

- San Francisco-Oakland Bay Bridge  
East Span Seismic Safety Project
- Transition Structure Portion of SFOBB

**# Map Reference**

Image: NIMA/USGS 2004  
Data: DMJM/Harris, EDAW  
5/09

0 100 200 300 Feet

Map 3. Focused APE





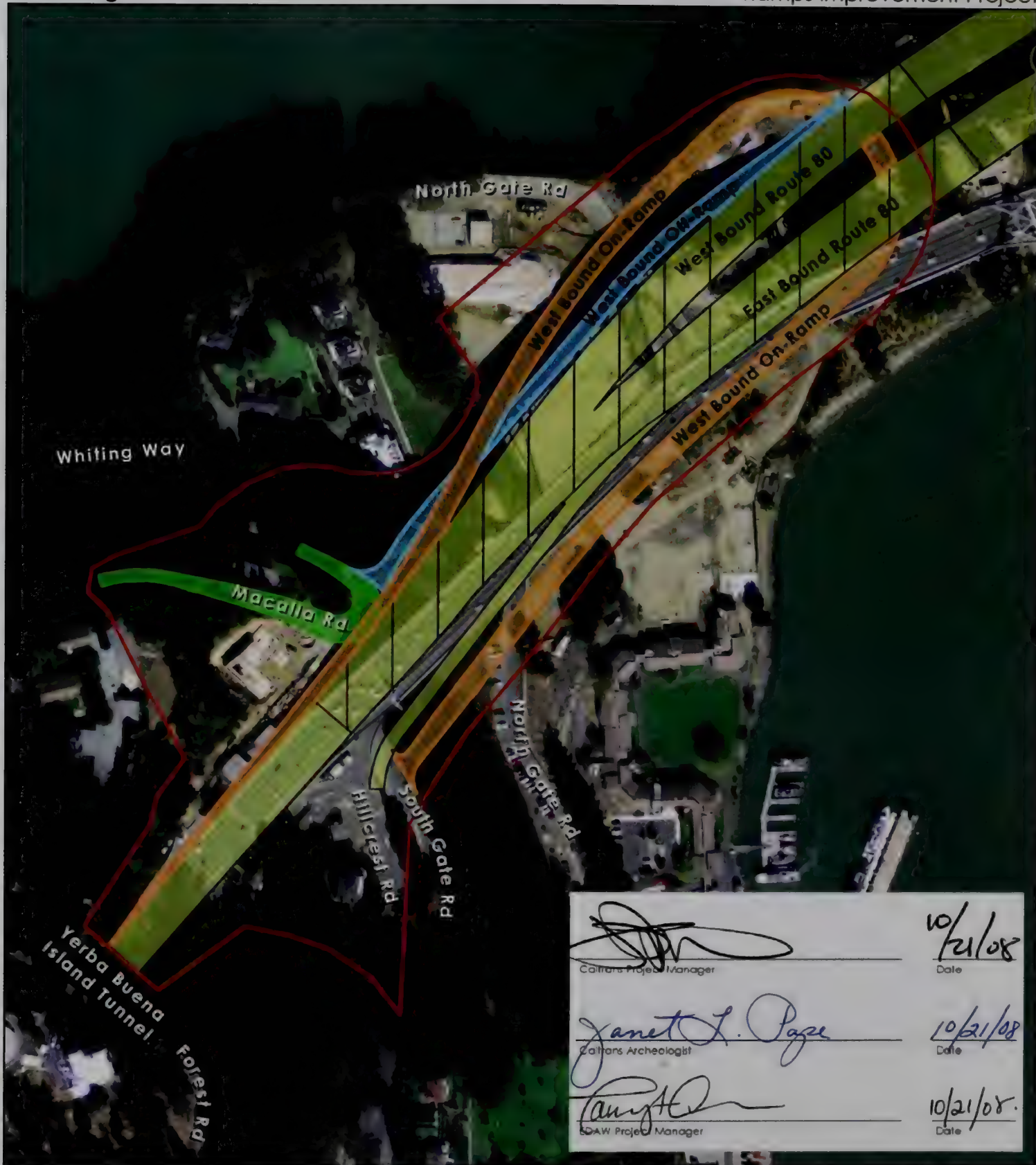
- Alternative 2b Proposed Ramps**
- Proposed West Bound Off-Ramp
  - Proposed West Bound On-Ramp
  - Proposed Macalla Road Improvements

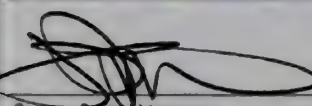
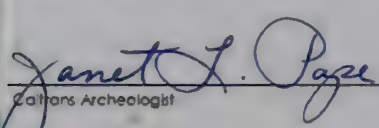
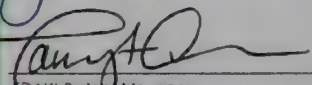
- Area of Potential Effect**
- Separate Project Currently Under Construction**
- San Francisco-Oakland Bay Bridge East Span Seismic Safety Project
  - Transition Structure Portion of SFOBB






**Map 3 : Alternative 4**  
**Archeological Area of Potential Effect**


Yerba Buena Island  
Ramps Improvement Project



	10/21/08
Caltrans Project Manager	Date
	10/21/08
Caltrans Archeologist	Date
	10/21/08
CAAW Project Manager	Date

**Alternative 4 Proposed Ramps**

-  Proposed West Bound Off-Ramp
-  Proposed West Bound On-Ramp
-  Proposed Macalla Road Improvements

 Area of Potential Effect

**Separate Project Currently Under Construction**



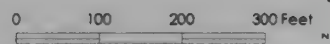
-  San Francisco-Oakland Bay Bridge East Span Seismic Safety Project
-  Transition Structure Portion of SFOBB

Image Nmap/USGS 2004  
Data: DMJM/Hans: EDA  
9/08









			105

			100
			100





## **Appendix B**

### **Visual Simulations and Renderings**





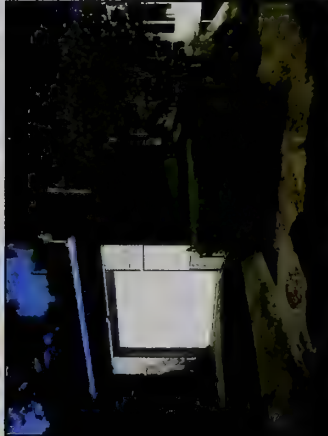
Figure 6: Alternative 2B  
Key Viewpoint 1: Macalla Road at North Gate Road Intersection



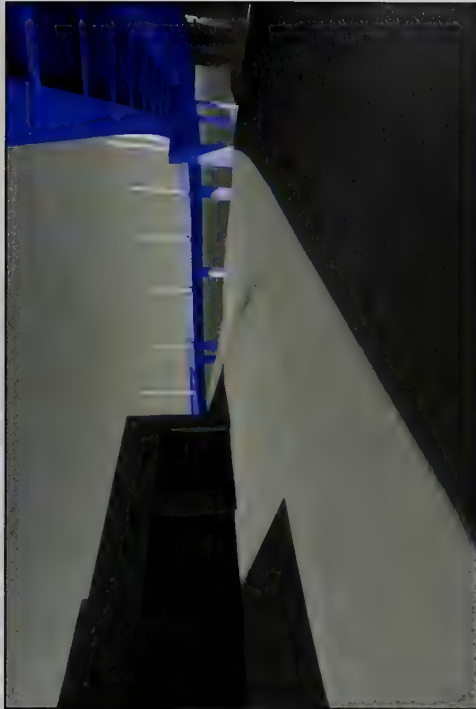
Rendered View



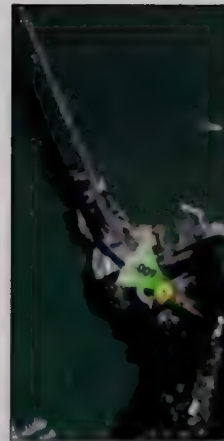
Quarters 10  
to be relocated as part of Alt. 2B



Building 267  
to be relocated as part of Alt. 2B



Alternative 2B Ramp Components; Blue highlighting distinguishes Alternative 2B ramp components from SFOBB East Span project components



Geographic Context  
Indicates distance from viewpoint to  
Alternative 2B ramp components





Figure 6a: Existing view, looking northeast  
Near Key Viewpoint 1: Macalla Road at North Gate Road Intersection



Quarters 10 and Building 267 (garage); white buildings with blue trim partly visible north of Macalla Road.

Structures at right are existing SFOB components.

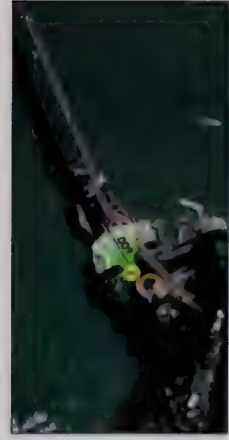


Figure 7: Alternative 2B  
Key Viewpoint 2: Nimitz House

Yerba Buena Island  
Ramps Improvement Project



Simulated View



Geographic Context  
Indicates distance from viewpoint to  
Alternative 2B ramp components



Existing View



Alternative 2B Ramp Components: Blue highlighting distinguishes Alternative 2B ramp components from SFO88 East Span project components

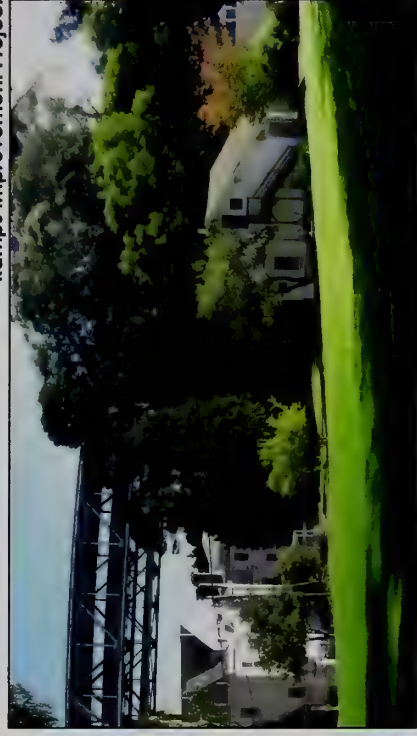




**Figure 8: Alternative 28  
Key Viewpoint 3: Officers' Quarters Open Space**

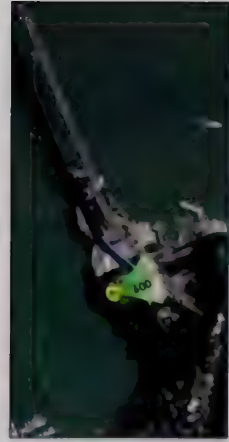


Simulated View



Existing View

**Yerba Buena Island  
Ramps Improvement Project**



Geographic Context  
Indicates distance from viewpoint to  
Alternative 28 ramp components

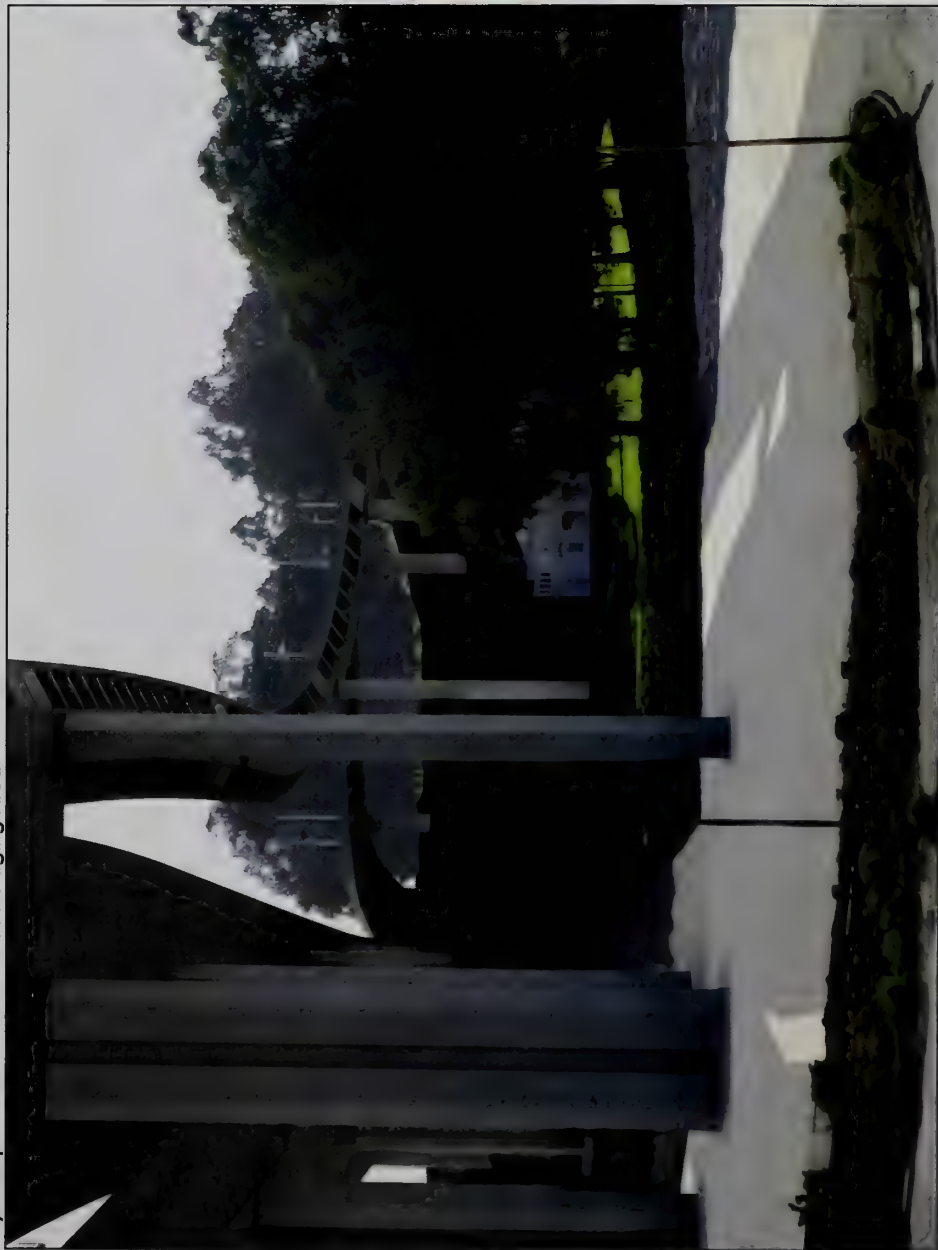


Alternative 28 Ramp Components: Blue highlighting distinguishes Alternative 28 ramp components from SFOBB East Span project components

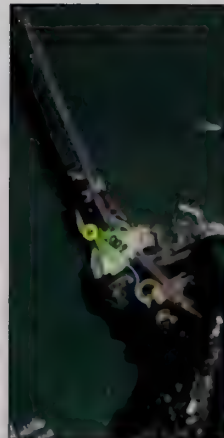




Figure 9: Alternative 2B  
Key Viewpoint 4: North Gate Road Staging Area



Simulated View



Geographic Context  
Indicates distance from viewpoint to  
Alternative 2B ramp components



Existing view is a composite of two images, resulting in natural lens and perspective distortion. Perspective correction was used to produce the simulated view.



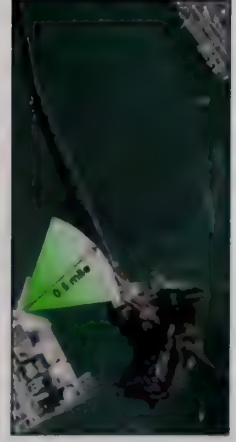
Alternative 2B Ramp Components: Blue highlighting distinguishes Alternative 2B ramp components from SFOBB East Span project components



Figure 10: Alternative 2B  
Key Viewpoint 5: Treasure Island



Simulated View

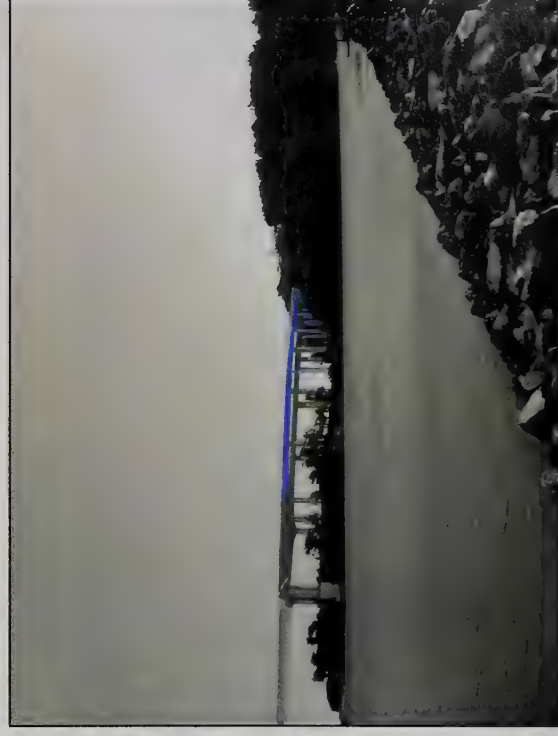


Geographic Context  
Indicates distance from viewpoint to  
Alternative 2B ramp components

Yerba Buena Island  
Ramps Improvement Project



Existing View



Alternative 2B Ramp Components: Blue highlighting distinguishes Alternative 2B ramp components from SFOBB East Span project components





**Figure 11: Alternative 28  
Key Viewpoint 6: Eastern Yerba Buena Island Waterborne Approach**



Simulated View

**Yerba Buena Island  
Ramps Improvement Project**



Existing View



Geographic Context  
Indicates distance from viewpoint to  
Alternative 28 ramp components



Alternative 28 Ramp Components: Blue highlighting distinguishes Alternative 28 ramp components from SFOBB East Span project components





Figure 12: Alternative 2B  
Key Viewpoint 7: Oakland Touchdown



Simulated View



View prior to SFOBB east span and Alternative 2B construction



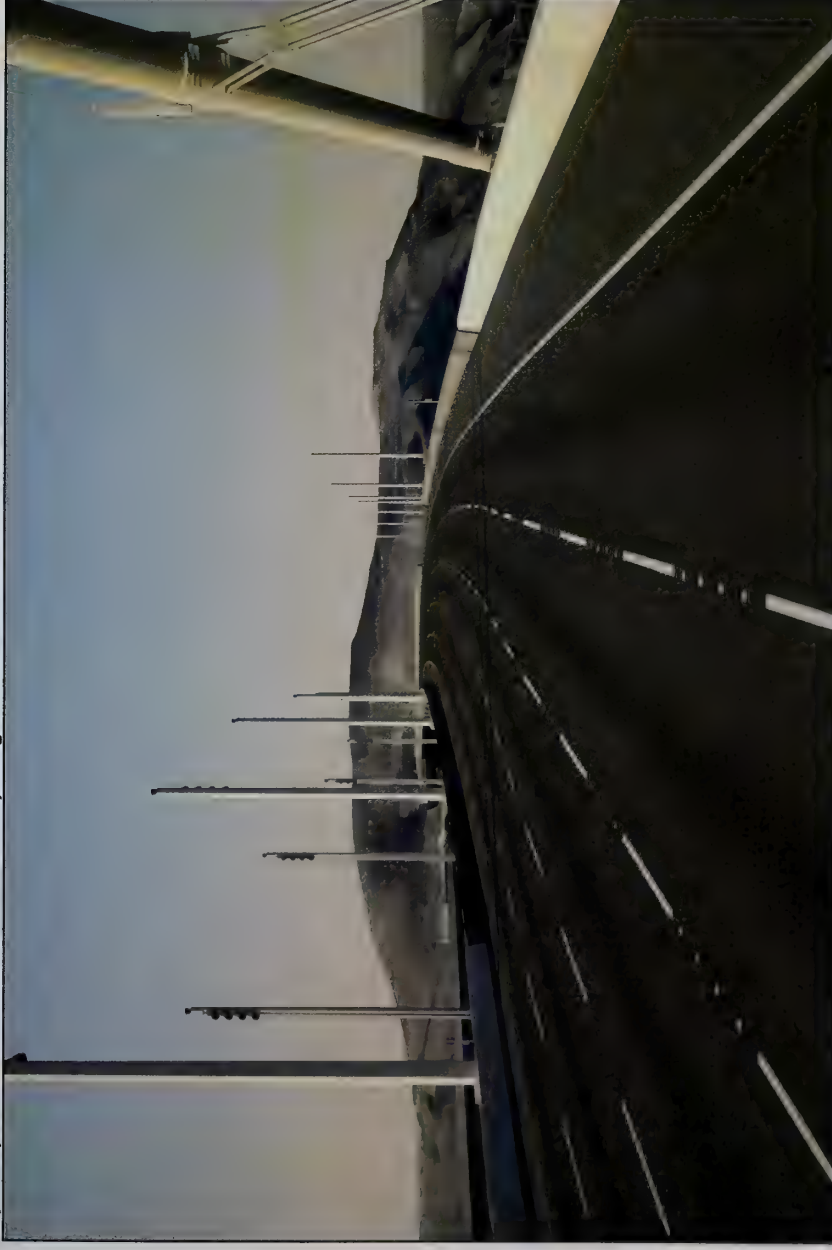
Alternative 2B Ramp Components: Blue highlighting distinguishes Alternative 2B ramp components from SFOBB East Span project components



Geographic Context  
Indicates distance from viewpoint to  
Alternative 2B ramp components



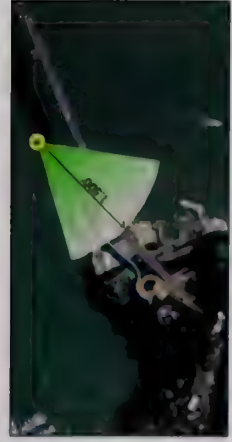
Figure 13: Alternative 2B  
Key Viewpoint 8: San Francisco-Oakland Bay Bridge Transition Structure



Rendered View



Alternative 2B Ramp Components: Blue highlighting distinguishes Alternative 2B ramp components from SFOBB East Span project components



Geographic Context  
Indicates distance from viewpoint to  
Alternative 2B ramp components





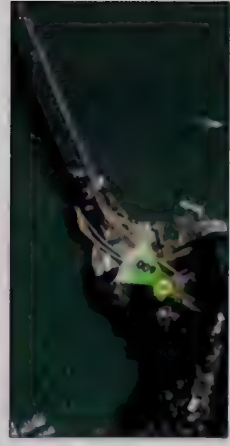
Figure 14: Alternative 4  
Key Viewpoint 1: Macallia Road at North Gate Road Intersection



Rendered View



Alternative 4 Ramp Components: Orange highlighting distinguishes Alternative 4 ramp components from SFOBB East Span project components



Geographic Context  
Indicates distance from viewpoint to  
Alternative 4 ramp components





Figure 14a: Existing view, looking northeast  
Near Key Viewpoint 1: Macalla Road at North Gate Road Intersection



Quarters 10 and Building 267 (garage); white buildings with blue trim partly visible north of Macalla Road.

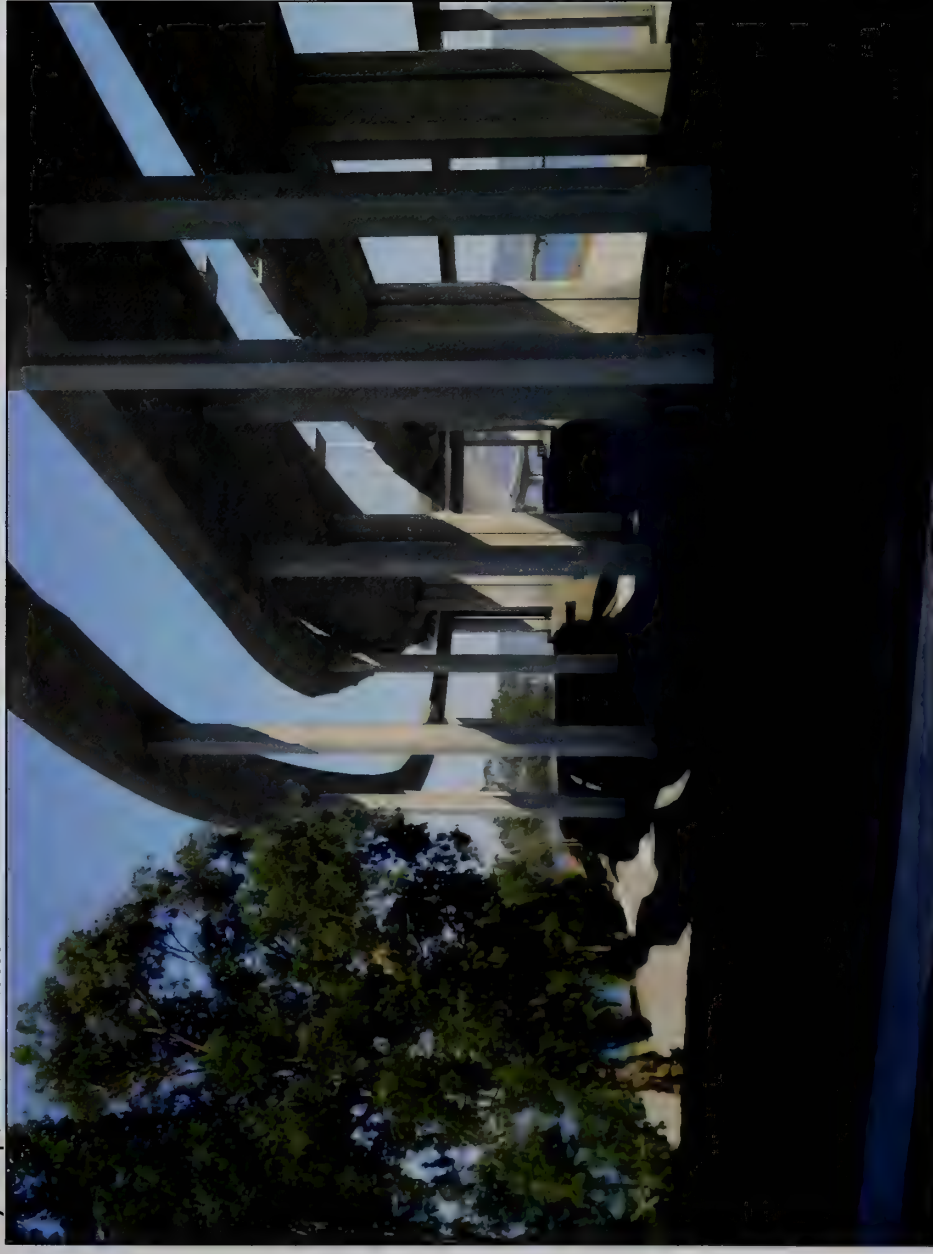
Yerba Buena Island  
Ramps Improvement Project

Structures at right are existing SFOBB components.

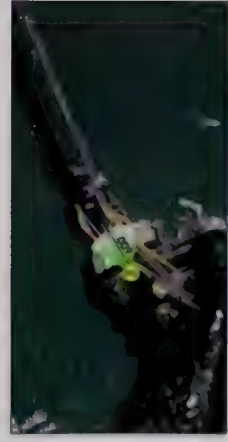


Figure 15: Alternative 4  
Key Viewpoint 2: Nimifz House

Yerba Buena Island  
Ramps Improvement Project



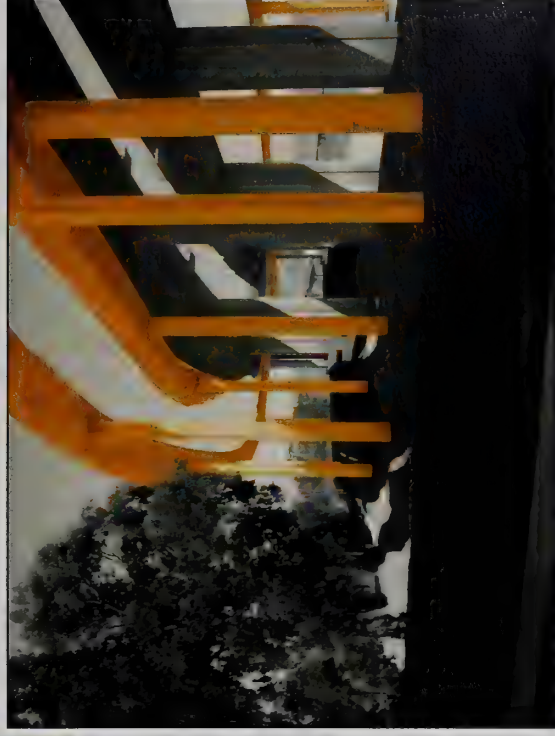
Simulated View



Geographic Context  
Indicates distance from viewpoint to  
Alternative 4 ramp components



Existing View



Alternative 4 Ramp Components: Orange highlighting distinguishes Alternative 4 ramp components from SFOBB East Span project components





**Figure 16: Alternative 4  
Key Viewpoint 3: Officers' Quarters Open Space**

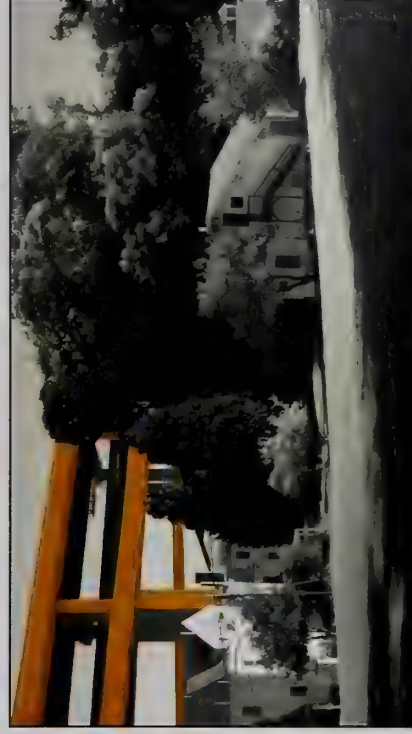


Simulated View

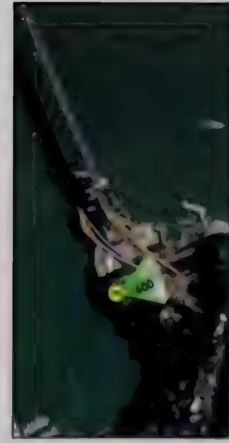
**Yerba Buena Island  
Ramps Improvement Project**



Existing View



Alternative 4 Ramp Components: Orange highlighting distinguishes Alternative 4 ramp components from SFOBB East Span project components

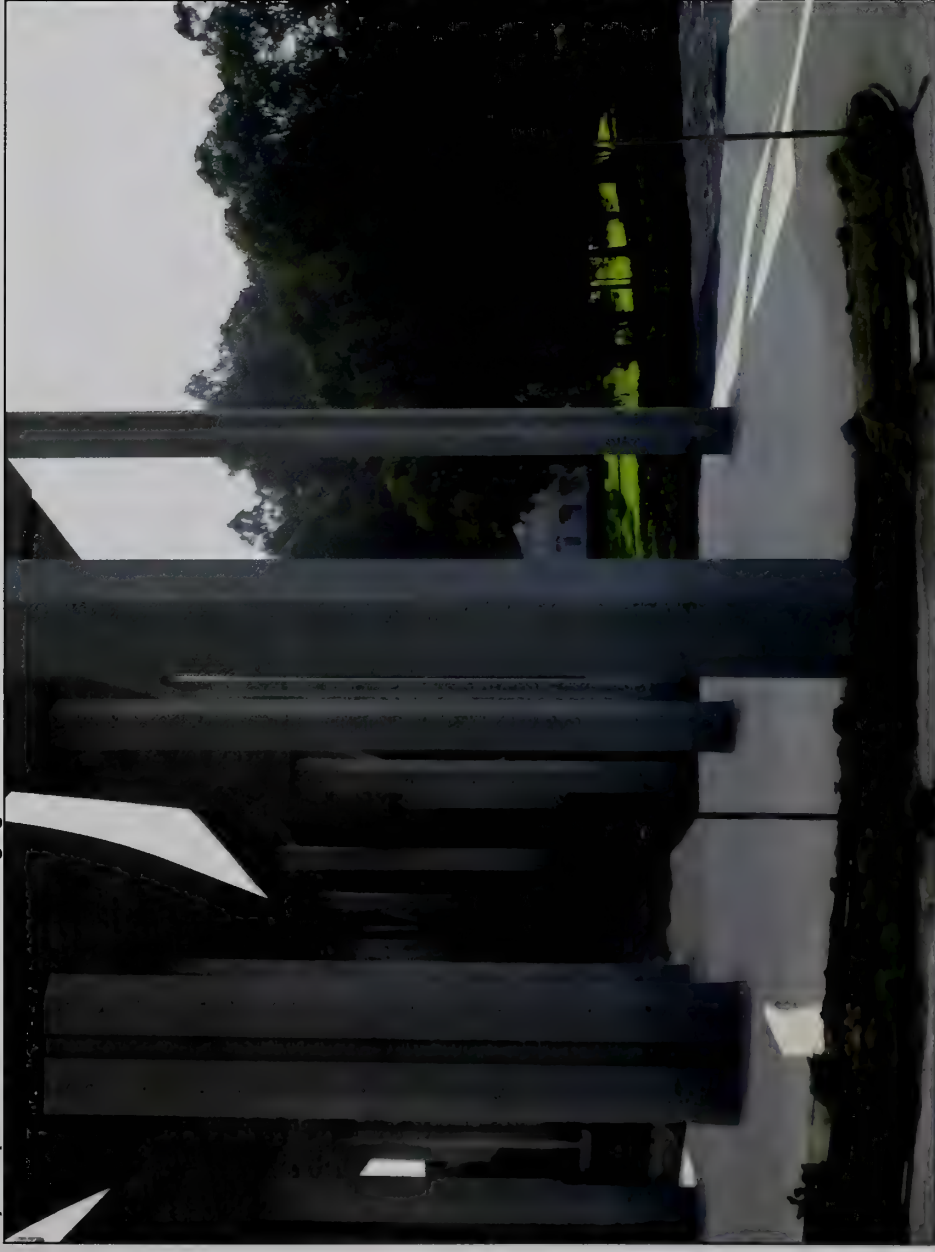


Geographic Context  
Indicates distance from viewpoint to  
Alternative 4 ramp components





Figure 17: Alternative 4  
Key Viewpoint 4: North Gate Road Staging Area

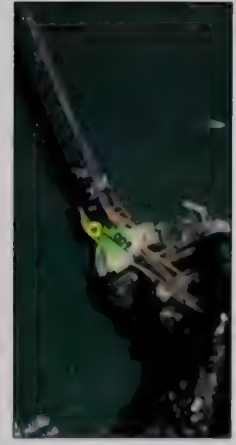


Existing view is a composite of two images, resulting in natural lens and perspective distortion. Perspective correction was used to produce the simulated view.



Alternative 4 Ramp Components: Orange highlighting distinguishes Alternative 4 ramp components from SFOBB East Span project components

Simulated View



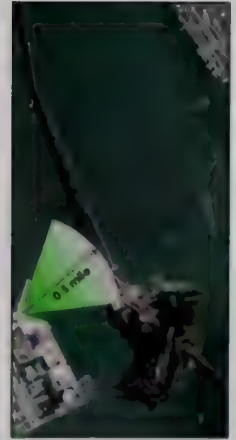
Geographic Context  
Indicates distance from viewpoint to  
Alternative 4 ramp components



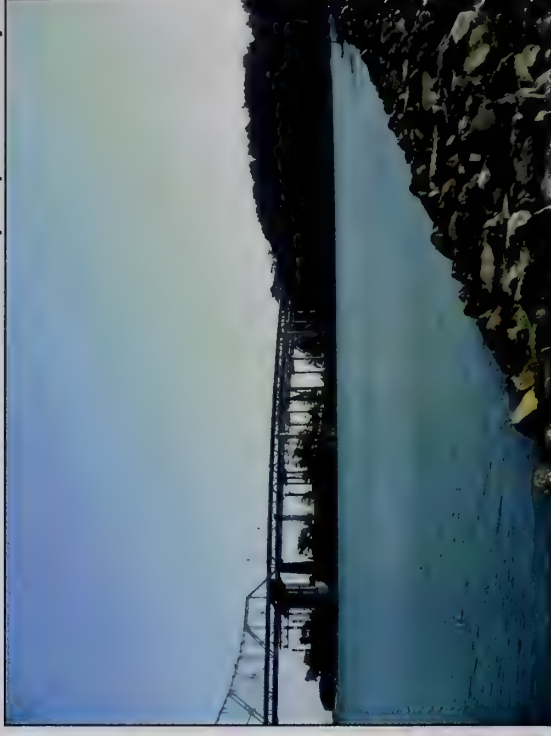
Figure 18: Alternative 4  
Key Viewpoint 5: Treasure Island



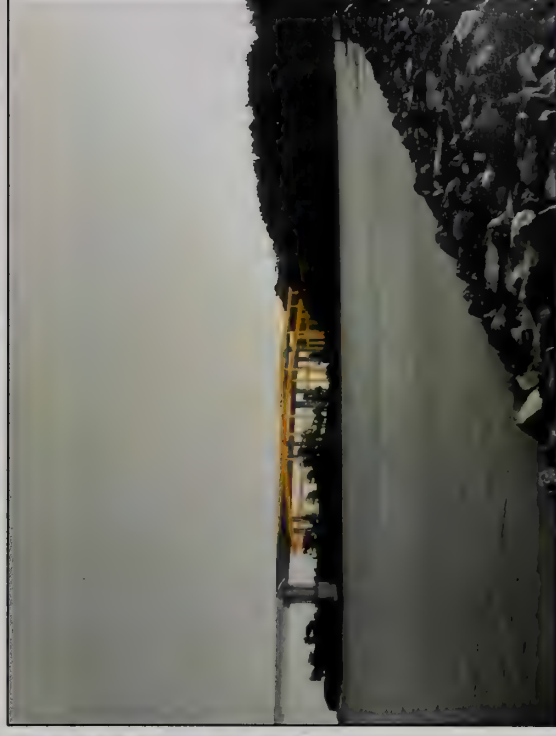
Simulated View



Geographic Context  
Indicates distance from viewpoint to  
Alternative 4 ramp components



Existing View



Alternative 4 Ramp Components: Orange highlighting distinguishes Alternative 4 ramp components from SFOBB East Span project components





**Yerba Buena Island  
Ramps Improvement Project**

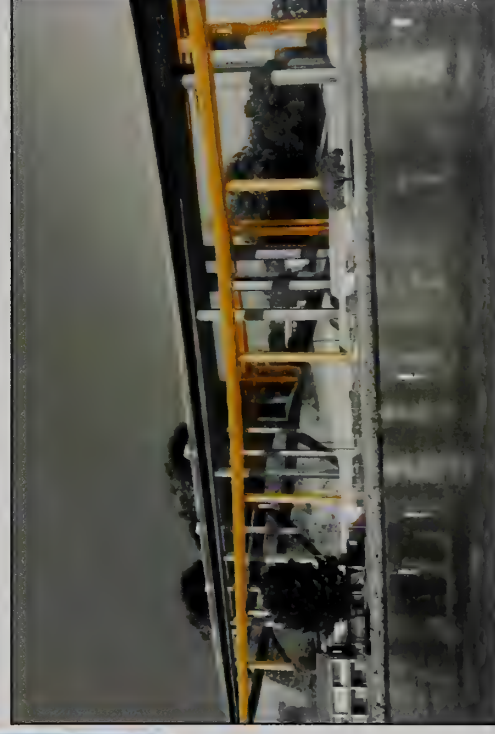
**Figure 19: Alternative 4  
Key Viewpoint 6: Eastern Yerba Buena Island Waterborne Approach**



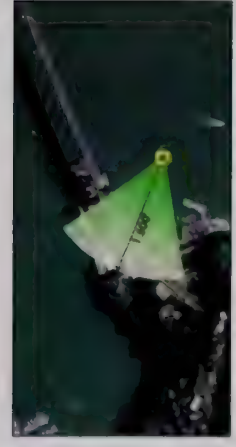
Simulated View



Existing View



Alternative 4 Ramp Components: Orange highlighting distinguishes Alternative 4 ramp components from SFOBB East Span project components



Geographic Context  
Indicates distance from viewpoint to  
Alternative 4 ramp components





Figure 20: Alternative 4  
Key Viewpoint 7: Oakland Touchdown



Simulated View



View prior to SFOBB east span and Alternative 4 construction



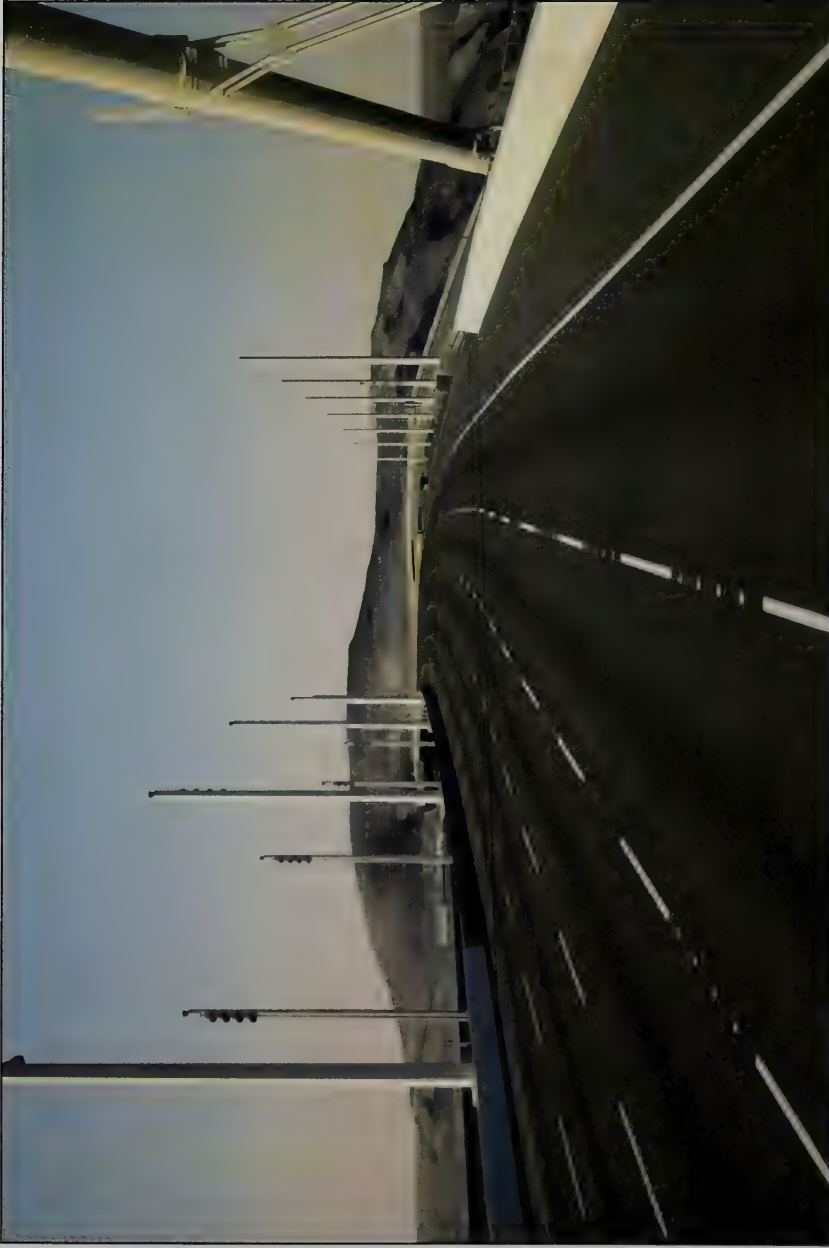
Alternative 4 Ramp Components: Orange highlighting distinguishes Alternative 4 ramp components from SFOBB East Span project components



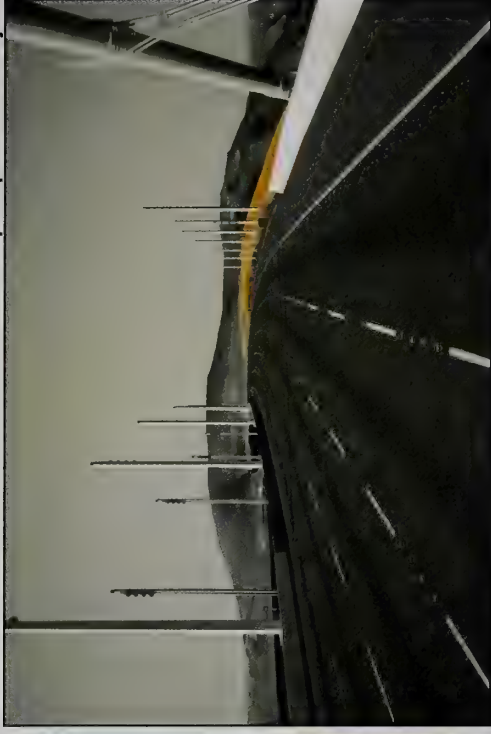
Geographic Context  
Indicates distance from viewpoint to  
Alternative 4 ramp components



Figure 21: Alternative 4  
Key Viewpoint 8: San Francisco-Oakland Bay Bridge Transition Structure



Rendered View



Alternative 4 Ramp Components: Orange highlighting distinguishes Alternative 4 ramp components from SFOBB East Span project components



Geographic Context  
Indicates distance from viewpoint to  
Alternative 4 ramp components





## **Appendix C**

### **Project Public Participation**

Partners  
Rand F. Herbert  
Stephen R. Wee  
Meta Bunse  
Christopher McMorris

**JRP**  
HISTORICAL CONSULTING, LLC

December 11, 2008

Jack Gold, Executive Director  
San Francisco Architectural Heritage  
2007 Franklin Street  
San Francisco, CA 94109


RE: Yerba Buena westbound on- and off-ramps, San Francisco-Oakland Bay Bridge

Dear Sir:

San Francisco County Transportation Authority (SFCTA) proposes the replacement of westbound on- and off-ramps to the San Francisco-Oakland Bay Bridge (SFOBB) on the east side of Yerba Buena Island. The proposed project would improve the seismic, traffic safety requirements, and design standards of the current ramps. SFCTA, in cooperation with the Caltrans, is preparing an Environmental Impact Report / Environmental Impact Statement (EIR/EIS) for the project, in accordance with the National Environmental Policy Act (NEPA) and the California Environmental Quality Act (CEQA). SFTA is the Lead Agency under CEQA, while Caltrans is the lead agency under NEPA. Maps depicting the project location and vicinity are attached.

SFCTA has formed a consultant team to perform preliminary engineering and environmental technical studies to meet these state and federal environmental requirements. JRP Historical Consulting, LLC, is part of this team and is preparing a technical study of the historic architectural and engineering resources in the proposed project area. Historical resources are those properties potentially eligible, determined eligible, or listed in the National Register of Historic Places or the California Register of Historical Resources. There are four historic properties within the proposed project area, three of which are currently listed in the National Register and California Register: the SFOBB, the Senior Officers Quarters Historic District, and Quarters 10 (including its garage, Building 267). The fourth historic property, Quarters 8, has been determined eligible for both the National Register and California Register. If you or your organization has any concerns regarding specific historic resources within the project area, please respond in writing to me at the address below citing your concerns within the next thirty days, or call me at (530) 757-2521.

Sincerely,



Rebecca Meta Bunse  
Partner





Figure 1. Project Location



Figure 2. Project Vicinity

Note: map included with each letter, but not repeated here in Appendix C.

Partners

Rand F. Herbert  
Stephen R. Wee  
Meta Bunse  
Christopher McMorris



December 11, 2008

M. Bridget Maley, President  
San Francisco Landmark Preservation Advisory Board  
1660 Mission Street, Ste. 500  
San Francisco, CA 94103

RE: Yerba Buena westbound on- and off-ramps, San Francisco-Oakland Bay Bridge

Dear Madam:

San Francisco County Transportation Authority (SFCTA) proposes the replacement of westbound on- and off-ramps to the San Francisco-Oakland Bay Bridge (SFOBB) on the east side of Yerba Buena Island. The proposed project would improve the seismic, traffic safety requirements, and design standards of the current ramps. SFCTA, in cooperation with the Caltrans, is preparing an Environmental Impact Report / Environmental Impact Statement (EIR/EIS) for the project, in accordance with the National Environmental Policy Act (NEPA) and the California Environmental Quality Act (CEQA). SFCTA is the Lead Agency under CEQA, while Caltrans is the lead agency under NEPA. Maps depicting the project location and vicinity are attached.

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Sincerely,

A handwritten signature in blue ink that reads "Meta Bunse".

Rebecca Meta Bunse  
Partner



## Partners

Rand F. Herbert  
Stephen R. Wee  
Meta Bunse  
Christopher McMorris

December 11, 2008

Mark Luellen, Preservation Coordinator  
San Francisco Planning Department  
1650 Mission Street, Suite 400  
San Francisco, CA 94103

RE: Yerba Buena westbound on- and off-ramps, San Francisco-Oakland Bay Bridge

Dear Sir:

San Francisco County Transportation Authority (SFCTA) proposes the replacement of westbound on- and off-ramps to the San Francisco-Oakland Bay Bridge (SFOBB) on the east side of Yerba Buena Island. The proposed project would improve the seismic, traffic safety requirements, and design standards of the current ramps. SFCTA, in cooperation with the Caltrans, is preparing an Environmental Impact Report / Environmental Impact Statement (EIR/EIS) for the project, in accordance with the National Environmental Policy Act (NEPA) and the California Environmental Quality Act (CEQA). SFTA is the Lead Agency under CEQA, while Caltrans is the lead agency under NEPA. Maps depicting the project location and vicinity are attached.

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Sincerely,



Rebecca Meta Bunse  
Partner



Partners  
Rand F. Herbert  
Stephen R. Wee  
Meta Bunse  
Christopher McMorris

December 11, 2008

Ron Ross, President  
San Francisco History Association  
PO Box 31907  
San Francisco, CA 94131

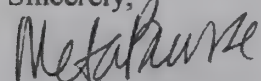
RE: Yerba Buena westbound on- and off-ramps, San Francisco-Oakland Bay Bridge

Dear Sir:

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Sincerely,



Rebecca Meta Bunse  
Partner

Partners  
Rand F. Herbert  
Stephen R. Wee  
Meta Bunse  
Christopher McMorris

December 11, 2008

Erik Christoffersen, Executive Director  
San Francisco Museum and Historical Society  
P.O. Box 420470  
San Francisco, CA 94142-0470

RE: Yerba Buena westbound on- and off-ramps, San Francisco-Oakland Bay Bridge

Dear Sir:

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Rebecca Meta Bunse  
Partner



Partners  
Rand F. Herbert  
Stephen R. Wee  
Meta Bunse  
Christopher McMorris

**JRP**  
HISTORICAL CONSULTING, LLC

December 11, 2008

David Crosson, Executive Director  
California Historical Society  
678 Mission Street  
San Francisco CA 94105

RE: Yerba Buena westbound on- and off-ramps, San Francisco-Oakland Bay Bridge

Dear Sir:

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Sincerely,



Rebecca Meta Bunse  
Partner



Partners

Rand F. Herbert  
Stephen R. Wee  
Meta Bunse  
Christopher McMorris

December 11, 2008

Leigh Ann Baughman, Executive Director  
San Francisco Beautiful  
564 Market Street, Suite 709  
San Francisco, CA 94104

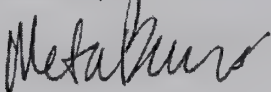
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Sincerely,



Rebecca Meta Bunse  
Partner

Partners

Rand F. Herbert  
Stephen R. Wee  
Meta Bunse  
Christopher McMorris

**JRP**  
HISTORICAL CONSULTING, LLC

December 11, 2008

William Applegate, President  
California Heritage Council  
P.O. Box 475046  
San Francisco, CA 94147

RE: Yerba Buena westbound on- and off-ramps, San Francisco-Oakland Bay Bridge

Dear Sir:

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Sincerely,



Rebecca Meta Bunse  
Partner



## Partners

Rand F. Herbert  
Stephen R. Wee  
Meta Bunse  
Christopher McMorris

December 11, 2008

Cindy Heitzman, Executive Director  
California Preservation Foundation  
5 Third St., Ste 424  
San Francisco, CA 94103

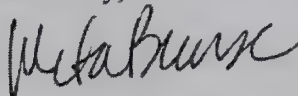
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Sincerely,



Rebecca Meta Bunse  
Partner



Partners  
Rand F. Herbert  
Stephen R. Wee  
Meta Bunse  
Christopher McMorris

**JRP**  
HISTORICAL CONSULTING, LLC

December 11, 2008

Anthea Hartig Ph.D., Director  
National Trust for Historic Preservation Western Office  
5 Third Street, Suite 707  
San Francisco, California 94103

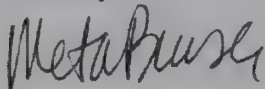
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Sincerely,



Rebecca Meta Bunse  
Partner

## Partners

Rand F. Herbert  
Stephen R. Wee  
Meta Bunse  
Christopher McMorris

December 11, 2008

John J. Reynolds, Director  
National Park Service, Pacific West Region Office  
1111 Jackson Street, Suite 700  
Oakland, California 94607

RE: Yerba Buena westbound on- and off-ramps, San Francisco-Oakland Bay Bridge

Dear Sir:

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Rand F. Herbert  
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Meta Bunse  
Christopher McMorris

**JRP**  
HISTORICAL CONSULTING, LLC

December 11, 2008

Valerie Garry, President  
Oakland Heritage Alliance  
446 17th Street, Suite 301  
Oakland, CA 94612

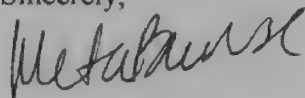
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Rebecca Meta Bunse  
Partner



## Partners

Rand F. Herbert  
Stephen R. Wee  
Meta Bunse  
Christopher McMorris

December 11, 2008

Joann Pavlinec, Secretary & Historic Preservation Planner  
Oakland Landmarks Preservation Advisory Board  
250 Frank H. Ogawa Plaza, Suite 3315  
Oakland, CA 94612

RE: Yerba Buena westbound on- and off-ramps, San Francisco-Oakland Bay Bridge

Dear Madam:

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Partner

Partners

Rand F. Herbert  
Stephen R. Wee  
Meta Bunse  
Christopher McMorris

**JRP**  
HISTORICAL CONSULTING, LLC

December 11, 2008

Betty Marvin, Planner  
Oakland Cultural Heritage Survey  
250 Frank Ogawa Plaza, Suite 3330  
Oakland, CA 94612

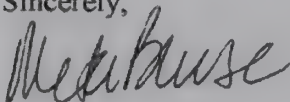
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Rebecca Meta Bunse  
Partner



Partners

Rand F. Herbert  
Stephen R. Wee  
Meta Bunse  
Christopher McMorris

**JRP**  
HISTORICAL CONSULTING, LLC

December 11, 2008

Winton "Mac" McKibben, President  
Alameda County Historical Society  
PMB 307  
484 Lake Park Ave.

RE: Yerba Buena westbound on- and off-ramps, San Francisco-Oakland Bay Bridge

Dear Sir:

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Rebecca Meta Bunse  
Partner



Partners  
Rand F. Herbert  
Stephen R. Wee  
Meta Bunse  
Christopher McMorris

**JRP**  
HISTORICAL CONSULTING, LLC

December 11, 2008

Alameda County Parks, Recreation and Historical Commission  
224 West Winton Ave., #111  
Hayward, CA 94544

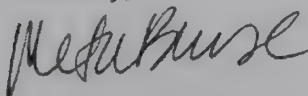
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Sincerely,



Rebecca Meta Bunse  
Partner

**Appendix D**  
**National Register of Historic Places Correspondence**

**OFFICE OF HISTORIC PRESERVATION  
DEPARTMENT OF PARKS AND RECREATION**

BOX 942896  
SACRAMENTO, CA 94296-0001  
(916) 653-6624 Fax: (916) 653-9824  
calshpo@ohp.parks.ca.gov



December 5, 2001

HARRY TAHATA  
CALIFORNIA DEPARTMENT OF TRANSPORTATION  
POST OFFICE BOX 23660  
OAKLAND, CA 94623-0660

EXECUTIVE OFFICE  
01 DEC 13 AM 10:22

**RE: SAN FRANCISCO—OAKLAND BAY BRIDGE  
OAKLAND, ALAMEDA COUNTY, CALIFORNIA  
SAN FRANCISCO, SAN FRANCISCO COUNTY, CALIFORNIA**

On August 13, 2001, the property listed above was placed on the National Register of Historic Places. On that date, this property was also placed on the California Register of Historical Resources, pursuant to Section 5024.1(d) of the Public Resources Code.

Placement on the National Register affords a property the honor of inclusion in the nation's official list of cultural resources worthy of preservation and provides a degree of protection from adverse effects resulting from federally funded or licensed projects. Registration provides a number of incentives for preservation of historic properties, including special building codes to facilitate the restoration of historic structures, and certain tax advantages.

There are no restrictions placed upon a private property owner with regard to normal use, maintenance, or sale of a property listed in the National Register. However, a project that may cause substantial adverse changes in the significance of a registered property may require compliance with local ordinances or the California Environmental Quality Act. In addition, registered properties damaged due to a natural disaster may be subject to the provisions of Section 5028 of the Public Resources Code regarding demolition or significant alterations, if imminent threat to life safety does not exist.

If you have questions or require further information, please contact the Registration Unit at (916) 653-6624.

Sincerely,

Dr. Knox Mellon  
State Historic Preservation Officer



**OFFICE OF HISTORIC PRESERVATION  
DEPARTMENT OF PARKS AND RECREATION**

P.O. BOX 942896  
SACRAMENTO, CA 94296-0001  
(916) 653-6624 Fax: (916) 653-9824  
calshpo@ohp.parks.ca.gov



May 1, 2008

Douglas E. Gilkey  
1455 Frazee Road, Suite 900  
San Diego, California 92108-4310

RE: Senior Officers Quarters Historic District, Yerba Buena Island Listing on the  
National Register of Historic Places

Dear Mr. Gilkey:

I am pleased to notify you that on February 26, 2008, the above-named property was placed on the National Register of Historic Places (National Register). As a result of being placed on the National Register, this property has also been listed in the California Register of Historical Resources, pursuant to Section 4851(a)(2) of the Public Resources Code.

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If you have any questions or require further information, please contact the Registration Unit at (916) 653-6624.

Sincerely,

A handwritten signature in dark ink, appearing to read "Stephen D. Mitchell" or similar, written over a horizontal line.

Milford Wayne Donaldson, FAIA  
State Historic Preservation Officer

**OFFICE OF HISTORIC PRESERVATION  
DEPARTMENT OF PARKS AND RECREATION**

P.O. BOX 942896  
SACRAMENTO, CA 94296-0001  
(916) 653-6624 Fax: (916) 653-9824  
calshpo@ohp.parks.ca.gov



May 1, 2008

Douglas E. Gilkey  
1455 Frazee Road, Suite 900  
San Diego, California 92108-4310

RE: Quarters 10 and Building 267, Yerba Buena Island Listing on the  
National Register of Historic Places

Dear Mr. Gilkey:

I am pleased to notify you that on February 26, 2008, the above-named property was placed on the National Register of Historic Places (National Register). As a result of being placed on the National Register, this property has also been listed in the California Register of Historical Resources, pursuant to Section 4851(a)(2) of the Public Resources Code.

Placement on the National Register affords a property the honor of inclusion in the nation's official list of cultural resources worthy of preservation and provides a degree of protection from adverse affects resulting from federally funded or licensed projects. Registration provides a number of incentives for preservation of historic properties, including special building codes to facilitate the restoration of historic structures, and certain tax advantages.

There are no restrictions placed upon a private property owner with regard to normal use, maintenance, or sale of a property listed in the National Register. However, a project that may cause substantial adverse changes in the significance of a registered property may require compliance with local ordinances or the California Environmental Quality Act. In addition, registered properties damaged due to a natural disaster may be subject to the provisions of Section 5028 of the Public Resources Code regarding demolition or significant alterations, if imminent threat to life safety does not exist.

If you have any questions or require further information, please contact the Registration Unit at (916) 653-6624.

Sincerely,

A handwritten signature in black ink, appearing to read "Milford Wayne Donaldson".

Milford Wayne Donaldson, FAIA  
State Historic Preservation Officer

April 25, 2008

The Director of the National Park Service is pleased to send you the following announcements and actions on properties for the National Register of Historic Places. For further information contact Edson Beall via voice (202) 354-2255, or E-mail: <Edson\_Beall@nps.gov> This and past Weekly Lists are also available here: <http://www.nps.gov/history/nr/nrlist.htm>

Our physical location address is:

National Park Service 2280, 8th floor  
National Register of Historic Places  
1201 "I" (Eye) Street, NW,  
Washington D.C. 20005

Please have any Fed Ex, UPS packages sent to the above address. Please continue to use alternate carriers, as all mail delivered to us via United States Postal Service is irradiated and subsequently damaged.

Landscape Architecture Month:  
<http://www.nps.gov/history/nr/feature/landscape/index.htm>

WEEKLY LIST OF ACTIONS TAKEN ON PROPERTIES: 4/14/08 THROUGH 4/18/08

KEY: State, County, Property Name, Address/Boundary, City, Vicinity, Reference Number, NHL, Action, Date, Multiple Name

CALIFORNIA, SAN FRANCISCO COUNTY,  
Administration Building, Treasure Island, SE Corner of Avenue of the Palms and California Ave., Treasure Island, 08000081, LISTED, 2/26/08

CALIFORNIA, SAN FRANCISCO COUNTY,  
Hall of Transportation, Treasure Island, SE Side of California Ave. between Avenue D and Avenue F, Treasure Island, 08000082, LISTED, 2/26/08

CALIFORNIA, SAN FRANCISCO COUNTY,  
Palace of Fine and Decorative Arts, Treasure Island, SE Side of California Ave. between Avenue F and Avenue I, Treasure Island, 08000083, LISTED, 2/26/08

CALIFORNIA, SAN FRANCISCO COUNTY,  
Quarters 10 and Building 267, Yerba Buena Island, Jct. Northgate & Macalla Rds., North Shore of Yerba Buena Island, Yerba Buena Island, 08000084, LISTED, 2/26/08





**APPENDIX K**  
**WATER QUALITY REPORT**





## Memorandum

To	Ed Pang	Page	1
CC			
Subject	Yerba Buena Island Ramps Improvement Project EIR/EIS Water Quality Technical Study Addendum		
From	Yvana Khun		
Date	July 9, 2010		

The following revisions are hereby made by addendum to the Final Water Quality Report dated August 21, 2009, based on comments from Caltrans Headquarters.

The first paragraph on page 1 under "I. Purpose of Study" has been revised as follows:

The purpose of this study is to assess the impacts on surface water and groundwater quality of the and describe measures to protect water quality during and after construction of proposed project and to propose measures to mitigate any water quality impacts associated with the construction of the proposed Yerba Buena Island (YBI) Ramps Improvement Project. The location of the project site is shown in **Figure 1**.

The following text has been added on page 1, following "I. Purpose of Study"

**Project Purpose and Need**

The purpose of the proposed project is to improve:

- Traffic safety for drivers using the westbound on- and off-ramps.
- Geometric design of the westbound on- and off-ramps on the east side of YBI to and from I-80; and
- Traffic operations levels of service (LOS) on the westbound on- and off-ramps.

The proposed project is needed for the reasons listed below and explained in subsequent paragraphs:

- **Geometric Design:** The existing westbound on-ramp merge lengths and off-ramp deceleration lengths on the east side of YBI do not meet current Caltrans standards. The existing westbound on-ramp on the east side of YBI has a very short merge distance of approximately 43 meters (141 feet) which calculates to a 1:11 transition rate. It has a steep entrance grade of approximately 10 percent leading to a 122-meter-long (400 feet) crest vertical curve, resulting in a 30 km/h (18.6 mph) design speed. Therefore, traffic cannot accelerate to a proper mainline speed of 80 km/h (50

mph) to merge with through traffic. The existing westbound off-ramp diverges from the left-side freeway lane. The left-side exit lane is nonstandard (Highway Design Manual Section 504.2) and is signed for 48 km/h (20 mph). The proposed ramps would meet Caltrans standards to a much greater extent than the existing ramps and is anticipated to improve the Level of Service (LOS) and safety of the ramps, as discussed below. LOS is a qualitative description of a ramp segment or intersection performance based on the criteria outlined in the Highway Capacity Manual (HCM). LOS ranges from A, which indicates free flow or excellent conditions with short delays, to F, which indicates congested or overloaded conditions with extremely long delays. Caltrans criteria are used to establish a goal of LOS C, when possible.

- **Operations:** Projections of 2035 traffic volumes indicate ramp operations at a failing LOS F on both the on- and off-ramps in both the morning and evening peak hours. Currently, the westbound left-lane off-ramp operates at LOS D in the morning peak hour and at LOS C in the evening peak hour. The existing westbound, on-ramp operates at LOS D in both the morning and the evening peak hours. In the future (2035) no build condition, both the westbound off-ramp and on-ramp would operate at LOS F in both the morning and the evening peak hours. Under the 2035 build condition without ramp meters, the westbound off-ramp would operate at LOS F in both peak hours, and the westbound on-ramp would operate at LOS F in the morning peak hour and LOS E in the evening peak hour. In the 2035 build condition with ramp meters, the proposed westbound off-ramp would operate at LOS E in both peak hours, and the proposed westbound on-ramp would operate at LOS C in both peak hours.
- **Safety:** The accident rate for the existing on- and off-ramps is higher than the statewide rate for similar facilities. The accident rate based on data collected over a 3-year period between April 1, 2003 and March 31, 2006 at all six ramps on YBI exceeded the statewide average rate (per million vehicle miles) for total collisions (sum of fatalities, injuries, and property damage) (TASAS Selective Accident Retrieval, Table B).<sup>1</sup> This 3-year period is the latest data available for the existing on- and off-ramps because these ramps have since been closed for the construction of the SFOBB ESSSP project. The Actual Accident Rate for the existing westbound on-ramp is 0.75 per million vehicle miles compared to a rate of 0.60 for similar facilities statewide. For the existing westbound off-ramp, the accident rate is 1.4 compared to a 1.15 rate per million vehicle miles for similar facilities statewide. Geometric improvement of the ramps would better meet Caltrans standards compared to the existing ramps and would improve the LOS and is expected to decrease the accident potential rate. Rear end collisions on the westbound on-ramp are expected to decrease under the proposed project. The existing westbound on-ramp would be replaced by a 267-meter-long (876 feet) on-ramp thereby providing more merge length for traffic to accelerate to mainline speed. The existing left-side off-ramp would be replaced by a right-side 340-meter-long (1,115 feet) off-ramp, which would provide

<sup>1</sup> TASAS Table B reports for accident data calculations are available for any highway or section of highway, any or all ramps, any or all intersections for any time period specified. The report shows both actual and average rates. The report also shows total accidents, fatalities, injuries, multi-vehicles, wet, dark, persons killed and injured and the significance. Table B was generated for all six ramps on YBI and included in the Draft Project Report (DPR) prepared for this project.



greater distance for deceleration. Ramp meters would better control the flow of traffic and further improve safety.

The following text has been added to the end of the third paragraph under "III. Regulatory Setting" on page 5:

Section 402 of the CWA establishes the National Pollutant Discharge Elimination System (NPDES) Permit, which directs that storm water discharges are point source discharges and establishes a framework for regulating municipal and industrial storm water discharges. To ensure compliance with CWA Section 402, on July 15, 1999, the SWRCB issued the NPDES Permit, Statewide Storm Water Permit for Caltrans (Order No. 99-06-DWQ, NPDES No. CAS000003) (Caltrans 2003a). The Permit regulates storm water discharges from Caltrans properties, facilities and activities during and after construction. The Caltrans General Permit allows the discharge of uncontaminated construction dewatering in conformance with storm water management plan (SWMP) procedures.

The following text has been added following the first paragraph on page 8:

Hazardous waste is regulated under Title 22, Division 4.5, of the California Code of Regulations (CCR). CCR Title 22, Division 4.5 consists of statutes and regulations intended to prevent ultimate mismanagement of hazardous waste, with the primary focus being preventing disposal at unauthorized locations. Hazardous waste is defined and categorized in Chapter 11 of Title 22. California Health and Safety Code Sections 25150 and 58012 grants the Department of Toxic Substances Control (DTSC) the authority to adopt standards and regulations dealing with the management of hazardous waste. The DTSC regulates hazardous waste in California, cleans-up existing contamination, and looks for ways to reduce the hazardous waste produced in California.

Section "IV. Project Location and Receiving Water Bodies and Groundwater" on pages 8 to 9 has been revised as follows:

#### **IV. PROJECT LOCATION AND RECEIVING WATER BODIES AND GROUNDWATER**

YBI is a 147-acre natural island that sits in the San Francisco Bay between the cities of San Francisco and Oakland. Land use within YBI has historically been dominated by various branches of the U.S. military. Current land uses on YBI involves operation and housing of USCG personnel. Several buildings on the island are used by Caltrans; Buildings 15 and 29 are being used as a substation/air compressor house and as a tow truck housing facility, respectively. AT&T owns two small buildings immediately south of the SFOBB East Span, where several underwater cables run onto the shore.

YBI serves as an access point for the adjacent man-made Treasure Island. The island's high point is located 338 feet above mean sea level, and large portions of it are undeveloped, with steep wooded hillsides leading down to the shoreline. Within the project area, the area just north and south of I-80 on the far east of the project area has an 8 percent representative



slope<sup>2</sup>. The area further east has a lower representative slope of 1 percent and the area west along I-80 toward the YBI Tunnel has a 40 percent representative slope. Finally, lands located further to the north and south of I-80 in the west side of the project area have a representative slope of 53 percent (USDA 2008a). The proposed project's build alternatives would occur within existing Caltrans right-of-way.

### **Existing Drainage**

The existing project site is located in a developed area surrounded by the San Francisco Bay. The existing areas include vegetation on moderate to steep slopes, as described above. In general, YBI's soil classification is dense to very dense silty sand with an infiltration rate that varies between 5.1 and 20 centimeters per hour (2 to 8 inches per hour) (AECOM 2009). Two soil groups exist within the project area; soil groups C and D. Hydrologic soil group C comprises approximately 20 percent of the project area of interest and is characterized as having a slow infiltration rate. Hydrologic soil group D which comprises approximately 80 percent of the project area is characterized as having a very slow rate of water infiltration (high runoff potential) and consists chiefly of clays.

Unlike most of mainland San Francisco, Treasure Island and YBI are served by separate storm water and wastewater systems (SFPUC 2004, p.8). As a result, surface runoff from the project area flows untreated to the San Francisco Bay via the San Francisco Municipal Separate Storm Sewer System (MS4). The MS4 within the project area is not connected to San Francisco city's MS4 or combined sewer systems.

## **V. WATER RESOURCES**

### **A. Storm Water**

~~YBI is a 147-acre natural island that sits in the San Francisco Bay between the cities of San Francisco and Oakland. YBI serves as an access point for the adjacent man-made Treasure Island. The island's high point is located 338 feet above mean sea level, and large portions of it are undeveloped, with steep wooded hillsides leading down to the shoreline. Within the project area, the area just north and south of I-80 on the far east of the project area has an 8 percent representative slope<sup>3</sup>. The area further east has a lower representative slope of 1 percent and the area west along I-80 toward the YBI Tunnel has a 40 percent representative slope. Finally, lands located further to the north and south of I-80 in the west side of the project area have a representative slope of 53 percent (USDA 2008a).~~

The proposed project is located in the San Francisco Bay watershed. The hydrologic sub-area information is as follows (CSU Sacramento 2008, see **Figure 4**):

- Hydrologic unit: Bay Bridges
- Hydrologic area: Bay Waters
- Hydrologic sub-area: Undefined, Sub-area 203.10
- Watershed area: 21,461 hectares (53,031 acres)
- Average annual rainfall: 536 millimeters (21.1 inches).

<sup>2</sup> The slope gradient is recorded as three separate values: a low value, a high value, and a "representative" value. The representative value indicates the expected value.

<sup>3</sup> The slope gradient is recorded as three separate values: a low value, a high value, and a "representative" value. The representative value indicates the expected value.

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The existing project site is located in a developed area surrounded by the San Francisco Bay. The existing areas include vegetation on moderate to steep slopes, as described above. In general, YBI's soil classification is dense to very dense silty sand with an infiltration rate that varies between 5.1 and 20 centimeters per hour (2 to 8 inches per hour) (AECOM 2009). Two soil groups exist within the project area; soil groups C and D. Hydrologic soil group C comprises approximately 20 percent of the project area of interest and is characterized as having a slow infiltration rate. Hydrologic soil group D which comprises approximately 80 percent of the project area is characterized as having a very slow rate of water infiltration (high runoff potential) and consists chiefly of clays.

Unlike most of mainland San Francisco, Treasure Island and YBI are served by separate storm water and wastewater systems (SFPUC 2004, p.8). As a result, surface runoff from the project area flows untreated to the San Francisco Bay via the San Francisco Municipal Separate Storm Sewer System (MS4). The MS4 within the project area is not connected to San Francisco city's MS4 or combined sewer systems.

The section "Existing Contamination" on pages 13 and 14 has been revised as follows:

**Existing Soil Contamination**

Along with other islands on San Francisco Bay, YBI has been used for military purposes over the years. Naval Station Treasure Island was decommissioned in 1997; however, USCG activity continues on YBI. Based on current and previous environmental investigations, several areas of known and potential contaminant sources have been identified on YBI (AECOM 2009).

The U.S. Navy occupies a significant portion of the project area on YBI. The U.S. Navy, as part of an Installation Restoration Program (IRP) for NSTI/YBI, established a Federal Facility Site Remediation Agreement among the U.S. Navy, the California Department of Toxic Substances Control (DTSC) and RWQCB. Under this agreement, the U.S. Navy agreed to undertake and report on specified tasks associated with environmental assessment and response actions at 25 Installation Restoration (IR) sites under the IRP in accordance with the Comprehensive Environmental Response, Compensation and Liability Act (CERCLA).

The Navy transferred ownership of Installation Restoration (IR) Sites 8, 11, and 29 to Caltrans through the Federal Highway Administration (FHWA). The data review conducted as part of the Hazardous Wastes Assessment (HWA) for the SFOBB ESSSP identified the following potential contaminant sources on the YBI Ramps Improvement Project site:

- IR Site 8: Former U.S. Army Point Sludge Disposal Area,
- IR Site 11: Former Landfill,
- IR Site 29: East Side Contaminated Bridge Soils, and
- Site 270: Leaking Underground Storage Tank (LUST) site associated with Building 270.

At the high portion of the North-east Point on YBI, elevated levels of beryllium, lead, and pesticides have been detected. Along the entire shadow area of the existing bridge and adjacent ramps, investigations indicate a potential for lead contamination in surficial soils. Petroleum hydrocarbons were also found at a former gas station and adjacent fire station.



~~both of which have been demolished. Petroleum hydrocarbons have also been found at an active underground storage tank (Leaking Underground Storage Tank or LUST). In addition, it has been established that there is petroleum hydrocarbon contamination in the groundwater. There is also probable Aerially Deposited Lead (ADL) contamination, primarily from tailpipe emissions, in the unpaved areas adjacent to the existing roadway.~~

The Site Management Plan for the Naval Station Treasure Island (Tetra Tech EM Inc. 2008) reflects the Navy's current strategies and schedules to achieve site closure at several sites on Naval Station Treasure Island. This plan indicates that environmental closeout schedules and site closure for Installation Restoration (IR) Sites 8, 11, and 29 as well as inactive fuel line YF3 may be impacted by construction activities related to the SFOBB and YBI Ramps Improvement Project. Site 8 is located on the northeast end of YBI and was used as an army sludge disposal area from the wastewater treatment plant for approximately 8 years between 1968 and 1976. Metals and pesticides have been identified as the contaminants of concern. Site 11 had been used as a landfill and contaminants of concern at this site include total petroleum hydrocarbons (TPH), polycyclic aromatic hydrocarbons (PAHs), volatile organic compounds (VOCs), and metals. Additional sources of contamination at the landfill include five underground storage tanks (USTs) and a fuel pipeline. Site 29 is located below and parallel to the SFOBB from the northeastern portion of YBI westward to the YBI tunnel. Site 29 contains lead due to maintenance of ramps (i.e., use of lead-based paint) as well as a result of vehicle emissions. An interim remedial investigation (RI) report for Sites 8 and 29 is being finalized and the RI report for Site 11 is in the process of being prepared. The estimated year for site closeout for all three sites is 2021.

The third paragraph under "B. Groundwater" on page 14 has been revised as follows:

Due to the absence of long-term monitoring of water levels, the natural groundwater depth is uncertain. The Packer testing<sup>4</sup> indicated that the bedrock was nearly impermeable below the weathered zone and therefore water introduced into the boreholes and in fractures of this material is not likely to perch at shallow depths. This leads to the possibility that the measured water depths were not representative and to drain away. ~~This leaves the possibility that the measured water depths are not normal and the natural groundwater table should~~ generally be expected near adjacent Bay levels. The ongoing Project Approval and Environmental Document (PA&ED) phase will determine the natural groundwater depth.

"A. Storm Water" under Section "V. Water Quality Impacts" on pages 14 and 15 has been revised as follows:

## **VI. WATER QUALITY IMPACTS**

### **A. Storm Water**

Caltrans has performed many studies to monitor and characterize highway storm water runoff throughout the State. Commonly found pollutants throughout the State are Total Suspended

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<sup>4</sup> Packer tests consist of isolating specific sections of a bedrock borehole so that water-quality samples can be collected and aquifer tests can be conducted. A series of such tests allows definition of the vertical distribution of water quality (usually contaminants) and hydraulic conductivity (pathways for water and contaminant movement) in an aquifer.



Solids (TSS), nitrate nitrogen, Total Kjeldahl Nitrogen (TKN), phosphorous, orthophosphate, copper, lead and zinc (Caltrans 2007c). Some sources of these pollutants are natural erosion, phosphorus from tree leaves, combustion products from fossil fuels, and the wearing of break-brake pads.

The westbound lanes of the new SFOBB as it approaches YBI would transition to a stacked configuration over the eastbound lanes. The proposed YBI ramps would connect to the high point of the westbound alignment located on this bridge. The SFOBB structures would be comprised of multi-cell cast-in-place concrete box girders. The structure depth would vary from approximately 1.8 to 5.9 meters (5.5 to 18 feet) (Caltrans 2000, p. 38). The current design of the proposed YBI ramp structures incorporates piped inlets directing storm water flows down the columns and into the Bay (Caltrans 2000, p. 38). The proposed drainage system would collect concentrated flows from the elevated ramp structures using inlets, storm drain pipes, and down drain trenches, ~~and convey the runoff to the BMPs for treatment. After treatment runoff will be conveyed to the existing west tie-in drainage system (AECOM 2009).~~ The existing ramps on YBI do not have any cross drains and the proposed YBI ramps do not include the construction of any new cross drains. Temporary (construction-related) and permanent drainage and treatment best management practices (BMPs) are currently in the conceptual design stage, as described in Section VI.

The first bullet point on page 16 has been revised as follows:

- **Alternative 2B:** Would include the removal of the existing westbound on- and off-ramps on the east side of YBI, the construction of a westbound off-ramp to Macalla Road on the east side of YBI, and construction of a westbound hook on-ramp from Macalla Road on the east side of YBI. The disturbed soil area estimated for Alternative 2B is approximately 2.3 acres. The disturbed soil area is the area from the edge of the pavement to the construction limits created by the cut and fill slopes. The disturbed soil area does not include the paved ramp area. This alternative would have less water quality impacts than Alternative 4 due to less disturbed soil area and less amount of impervious area added to YBI. The amount of impervious area would increase from an existing 8.47 acres to 10.42 acres, a change of 1.95 acres (AECOM 2009; see Attachment 1). The percent of impervious area is expected to increase from 47% to 58% for the project site. Pervious area is the difference between the total area and impervious area within the project right-of-way. The surface runoff from Alternative 2B would be collected to the outfall near Macalla Road and treated in a BMP which is yet to be determined. ~~It is anticipated, however, that detention devices, lined biofiltration swales, and media filters would be used to treat runoff prior to discharge (as identified below in Section VI). For Alternative 2B, the required water quality treatment flow was calculated as approximately 0.0214 cubic meter per second (m<sup>3</sup>/s). The required water quality treatment volume was calculated to be 119 cubic meters (m<sup>3</sup>) (AECOM 2009; see Attachment 1).~~

The second bullet point on pages 16 and 17 has been revised as follows:

- **Alternative 4:** Would include the removal of the existing westbound on- and off-ramps on the east side of YBI, the construction of westbound on-ramp from Hillcrest Road, and construction of westbound off-ramp to Macalla Road on the east side of YBI. Alternative 4 would have the most water quality impacts of the three alternatives. The disturbed soil area estimated for Alternative 4 is approximately 4.4 acres, as it has the largest soil disturbance area, the largest increase in impervious area, and construction work would be required closer

to San Francisco Bay. The amount of impervious area would increase from an existing 6.34 acres to 10.74 acres, a change of 4.40 acres (AECOM 2009; see Attachment 1). The percent of impervious area is expected to increase from 59% to 100% for the project site. Surface runoff from the northern half of this alternative would be collected at the outfall near Macalla Road. Surface runoff from the southern portion of this alternative would be collected to the outfall near South Gate Road. The location and types of Permanent Design BMPs that would be used to control this surface runoff of BMPs that would be used to treat this surface runoff are in the conceptual design state and would be developed in detail at a future time; however, it is anticipated that detention devices, lined biofiltration swales, and media filters would be used to treat runoff prior to discharge (as identified below in Section VI). For Alternative 4, the required water quality treatment flow was calculated as approximately 0.0242 m<sup>3</sup>/s. The required water quality treatment volume was calculated to be 267 m<sup>3</sup> (AECOM 2009; see Attachment 1).

The first full paragraph and second paragraph on page 17 has been revised as follows:

An integrated bridge and ramp drainage system would be designed and constructed within the YBI Ramps Improvement Project limits to collect all storm water runoff. An independent ramp drainage system would be designed and constructed to collect all ramp surface runoff. For all slopes, benching, rounding, and terracing would be considered to minimize concentrated flows and slope stabilization measures and retaining walls may be needed. In addition, slopes would include pipe or flume downdrains to collect concentrated flows, minimize erosion, and direct storm water into the proposed drainage system for treatment (AECOM 2009). The need for slope stabilization and possible retaining walls would be determined as the project progresses. In addition, slopes would include concrete side drains to collect concentrated flows, minimize erosion, and direct storm water in the proposed drainage system and acceptable BMPs, which would eventually terminate into San Francisco Bay.

The pollutant load from the proposed YBI ramp area is negligible when compared to the overall pollutant loadings to the San Francisco Bay from the entire watershed and would not have a net impact on the overall water quality in San Francisco Bay. San Francisco Bay is listed as impaired for a number of pollutants outlined in Section IV.A above; however, only mercury (under the Caltrans general metals category) is listed on the Caltrans targeted design constituent (TDC) list. Thus, for design and stormwater permit purposes, any treatment BMPs for consideration include those used to treat general metals/general purpose pollutants. Temporary construction site BMPs, permanent design pollution BMPs, and permanent treatment BMPs, would be required to minimize or prevent impacts on water quality and pollutant loading, particularly during times of large flood flow runoff. Suggested BMPs are described below in Section VI. The total mass of storm water pollution is not expected to change as a result of the project since the total usage hours are not expected to increase and the pollutant generation rate is not expected to increase (Caltrans 2001, p. 4-68).

"B. Groundwater" on page 17 has been revised as follows:

#### **B. Groundwater**

Groundwater may be encountered during construction. At this time, excavated spoils soil would be is considered potentially hazardous along with any groundwater encountered and



would require appropriate collection, testing, and if applicable, transport offsite for treatment and disposal.

Section "VI. Avoidance, Minimization and/or Mitigation Measures" on page 17 and 18 has been revised as follows:

## **VII. AVOIDANCE AND, MINIMIZATION AND/OR MITIGATION MEASURES**

### **A. Section 401 of the Clean Water Act**

There are potential Waters of the U.S. onsite<sup>5</sup>; however, verification has not yet been completed by the U.S. Army Corps of Engineers regarding if they are considered jurisdictional. If it is determined that there would be impacts to existing wetlands and Waters of the U.S. within the project limits, an Army Corps 404 permit would be required along with a 401 Water Quality Certification from Region 2.

~~A~~Avoidance and minimization efforts including BMPs to avoid discharge to waters of the U.S. have been considered and described in the Natural Environment Study (NES) as well as in this Water Quality Report in the case that the U.S. Army Corps of Engineers makes a determination that a 401/404 permit is needed. Any impacts to Water of the U.S. and appropriate mitigation measures would be described in the Environmental Impact Statement/Environmental Impact Report (EIS/EIR) for the Yerba Buena Island Ramps Improvement Project.

### **B. Section 402 of the Clean Water Act**

Given a projected disturbance of greater than 0.4 hectares (one acre), the project is subject to Caltrans' statewide NPDES permit and Construction General permit. A SWPPP would be developed prior to construction. This dynamic document addresses the deployment of various erosion and water pollution control measures that are required commensurate to changing construction activities. The purpose of the SWPPP would be to identify pollutant sources that may affect the quality of the storm water discharges associated with the construction activities of the project and to identify, construct, and implement storm water pollution control measures to reduce pollutants in storm water discharges from the construction site during and after construction.

According to the Caltrans NPDES and General Permits, Best Management Practices (BMPs) would be incorporated into the proposed project to reduce the discharge of pollutants during and after construction to the Maximum Extent Practicable (MEP). These BMPs fall into ~~three~~ four categories, temporary Construction Site BMPs, permanent Design Pollution Prevention BMPs, and permanent Treatment BMPs, and operational maintenance BMPs.

The last paragraph on page 19 has been deleted as follows:

~~Given a projected disturbance of greater than 0.4 hectares (one acre), a SWPPP would be developed prior to construction. This dynamic document addresses the deployment of~~

<sup>5</sup> Waters of the U.S. include navigable waters, interstate waters, territorial seas, and other waters that may be used in interstate or foreign commerce. In the proposed YBI ramp area, there is no evidence of wetlands. Waters of the U.S. consist solely of unvegetated waters flowing in concrete or roadside swales.



various erosion and water pollution control measures that are required commensurate to changing construction activities. The purpose of the SWPPP would be to identify pollutant sources that may affect the quality of the storm water discharges associated with the construction activities of the project and to identify, construct, and implement storm water pollution control measures to reduce pollutants in storm water discharges from the construction site during and after construction.

Section "(3) Permanent Treatment BMPs" has been revised as follows:

### (3) Permanent Treatment BMPs

The PPDG Section 4 (Caltrans 2007b) describes the process for determining the need for permanent treatment BMPs. As the YBI Ramps Improvement Project will discharge water into surface waters that have TMDLs and other pollution controls, as described in Section IV, treatment BMPs are required. In addition, the project is within an urban MS4 area and would cause a change to historic drainage patterns. The project would also indirectly discharge surface runoff into the San Francisco Bay, and is considered a major reconstruction project<sup>6</sup> resulting in a net increase of greater than one acre of new impervious surface. According to the PPDG evaluation process, this project must consider permanent treatment BMPs. The TMDL established for mercury, as described in Section IV, will affect the selection of permanent treatment BMPs.

Treatment BMPs are permanent devices and facilities that treat storm water runoff. Caltrans-approved Treatment BMPs include Biofiltration Systems (Biofiltration Strips and Swales), Infiltration Basins, Detention Basins, Traction Sand Traps, Dry Weather Flow Diversions, Media Filters, Gross Solids Removal Devices (GSRDs), Multi-Chamber Treatment Trains, and Wet Basins. Those most feasible in the Bay Area are Biofiltration Systems, Infiltration Basins, Detention Basins, Dry Weather Flow Diversions, Media Filters, and Multi-chamber Treatment Trains. The selected treatment BMPs have been identified in the project's SWDR (AECOM 2009). Bioswales are identified in the project's current SWDR as the preferred treatment BMP for consideration of incorporation into the project design (AECOM 2009).

The SWDR identified Infiltration Devices as infeasible for the project site, as portions of the project site are known to have hazardous soil and contaminated groundwater. In addition, the impermeable soil found at the project site restricts opportunities for the use of infiltration devices (AECOM 2009). Multi-chamber Treatment Trains are also not appropriate at this

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<sup>6</sup> As defined in the Storm Water Quality Handbook (Caltrans 2007b), new construction and major reconstruction includes new routes, route alignments, and route upgrades. New construction activity does not include routine maintenance to maintain original line and grade, hydraulic capacity, or original purpose of the facility, nor does it include emergency construction activities required to protect public health and safety. New Construction and major reconstruction projects may include, but are not limited to: new highways and freeways; highway-related facilities, including new or reconstructed maintenance facilities; safety roadside rest areas, toll plazas and inspection and weigh stations; adding one or more lanes; adding HOV lanes; construction activities conducted within highway rights of way in conjunction with a new facility; new or reconstructed interchanges, including on-ramps, off-ramps, and connectors; new or reconstructed bridges; tunnels; and drainage system improvements, including changes to pipes, conduits, channels, etc.

~~project, as this project does not fall into any of the relevant categories (vehicle service facilities, parking areas, paved storage areas, or fueling stations). In addition, since dry weather flow diversions address non-storm water flows only, Dry Weather Flow Diversions are not recommended.~~

~~Detention Devices and Media Filters were evaluated as possible types of permanent Treatment BMPs. Detention Devices are effective at removing total suspended solids (TSS), phosphorus, particulate metals, and litter by temporarily detaining storm water runoff to allow sediment and particulates to settle out before it is discharged. Media Filters, specifically the Austin Vault Sand and Delaware Sand filters, are effective at removing general purpose pollutants. Both Detention Devices and Media Filters may require an impermeable lining to avoid leaking into potentially contaminated groundwater. Right of way concerns as well as the cost of these two permanent treatment BMPs were also considered to be issues in the PA&ED evaluation. However, Biofiltration Systems were identified as the favored permanent treatment BMP option.~~

The following text has been added following the third paragraph on page 21:

(4) Operation/Maintenance Stormwater BMPs

As described in the Caltrans Maintenance Manual (July 2006), it is the policy of Caltrans that the Division of Maintenance will:

- (A) Implement the Maintenance Storm Water Management Program described in the Statewide Storm Water Management Plan;
- (B) Implement the Best Management practices defined in the Caltrans Storm Water Quality Handbook Maintenance Staff Guide;
- (C) Follow all appropriate State, federal, and local laws and regulations regarding water quality including all court orders and consent decrees.
- (D) Meet all requirements of the RWQCB and SWRCB permits and orders.

As described in the Caltrans Maintenance Manual Chapter C5, "Drainage Facilities, Fences, and Roadside Appurtenances," typical maintenance BMPs that could be used for stormwater control after the proposed project is constructed include, but would not be limited to (Caltrans 2006):

- C5.10.1 - Inspections of drainage facilities by District Maintenance Supervisors  
Visual, surface level inspections of drainage facilities shall be made annually and during and after each major storm to identify obvious defects, hazards or potential problems, and also to monitor known problems.
- C5.10.2 - Inspections of drainage facilities by District Culvert Inspection Program  
Thoroughly evaluates drainage facilities condition and identifies deficiencies at early stages where corrective maintenance strategies will be effective, or prevent failure from occurring.



- C5.12 - Ditches and Gutters

Ditches and gutters should be inspected periodically and maintained to permit free flow. Lined ditches and gutters should be sealed or repaired to maintain structural integrity.

- C5.14 - Under Drains, Horizontal Drains and Down Drains

Under drains (including underground groundwater relief systems, horizontal drains-cut slope groundwater drains, and down drains), surface drainage conduits, and accompanying collector systems should be inspected once a year and cleaned or repaired as necessary to ensure free flow. Surface water should not be permitted to discharge into an under drain.

- C5.15 - Edge Drains

Edge drains should be inspected early in the winter season to assure that they are functioning. Edge drains should be inspect during or shortly after a rainstorm to observe the flow. If a drain appears to be clogged, it may be checked with a "snake" and cleaned by water jet equipment if necessary. Clean outs have been installed for this purpose.

- C5.16 - Structure Drainage Systems

Bridge drainage systems should be inspected annually prior to the rainy season, and cleaned where necessary. These systems should be observed during storms to ensure proper functioning

- C5.21 - Maintenance of Over Side Drains and Slope Ditches

Pipe or flume down drains should be maintained intact, and in the case of metal assemblies, maintained in tight contact with shoulder surfacing, side ditch lining, and dike paving. If embankment settlement occurs, restore to grade, and re-establish down drains or spillway, side ditch and dike. Fill and seal cracks around inlets of down drains to prevent seepage of water into embankment areas. If Rock Slope Protection is provided at the end of down drains, they should also be inspected and repaired if needed.

A new Section "IX. Recommendation to Designers" has been added prior to "References" on page 22:

**IX. RECOMMENDATION TO DESIGNERS**

Storm water discharges from construction activities of the proposed project would require permitting under Caltrans' Statewide Storm Water NPDES permit and discharges would also have to comply with the substantive provisions of the SWRCB's Statewide General Construction Permit. The proposed project would also require the preparation and implementation of a SWPPP. Coordination between the San Francisco Bay RWQCB and Caltrans District 4 would be crucial to ensure that all agency requirements and environmental concerns are addressed.



If utilized, bioswales would be designed in close consultation with the Regional/District NPDES coordinators due to the site's hazardous soil conditions and would likely require the use of impermeable liners and an underdrain.

Discharge to the storm sewer system (and eventually to the Bay) or directly to the Bay would be addressed by the Caltrans General Permit, which incorporates performance requirements and other technical provisions and would be subject to the quantitative water quality objectives included in the San Francisco Bay RWQCB Basin Plan.

Section "VII. References" has been revised as follows:

#### **VIII. REFERENCES**

AECOM. 2009. Draft Final Long Form - Storm Water Data Report. Prepared for Caltrans. February 12 ~~August 17~~, 2009.

California Department of Transportation (Caltrans). 2007c. Revised Water Quality Report for Caldecott Tunnel Improvement Project. April 27, 2007.

California Department of Transportation (Caltrans). 2006. Maintenance Manual Volume 1. July. Chapter C5 and F.

Pages 25 and 26 have been deleted.



## **Water Quality Report for Yerba Buena Island Ramps Improvement Project August 21, 2009**

### **I. PURPOSE OF STUDY**

The purpose of this study is to assess the impacts on surface water and groundwater quality of the proposed project and to propose measures to mitigate any water quality impacts associated with the construction of the proposed Yerba Buena Island (YBI) Ramps Improvement Project. The location of the project site is shown in **Figure 1**.

### **II. PROJECT DESCRIPTION**

Yerba Buena Island (YBI) is located in the San Francisco Bay approximately halfway between Oakland and San Francisco. YBI is only accessible to vehicular traffic via the San Francisco Oakland Bay Bridge (SFOBB) stretch of I-80. The SFOBB is considered a "lifeline structure" and is a critical link between the East Bay and San Francisco. It provides the only vehicle access to YBI, the active U.S. Coast Guard (USCG) facilities located on the south side of the island, and Treasure Island, located immediately north of YBI. The project is located in San Francisco County and is within the San Francisco Bay Central Basin, one of seven major hydrologic units within the Region.

A large amount of the island's surface area is covered with thick vegetation consisting mostly of stands of large, mature eucalyptus trees, smaller ornamental landscape trees, shrubs and lawn areas. The south side of YBI hosts facilities of the USCG, and portions of the island are currently used to store materials related to construction and maintenance of the SFOBB. In addition, YBI has 105 housing units, which range from large single family residences originally built for military officers to two to four-unit buildings. Developed areas of the island are scattered throughout. The southern fringe of the island, where the USCG facility is located, is mostly flat and open with somewhat less vegetation cover.

The proposed project would replace the existing westbound on- and off-ramps located on the east side of YBI with new westbound on- and off-ramps. The new ramps would maintain the functional role of the current ramps while satisfying seismic requirements, highway design standards, traffic operations, and improve safety. The YBI Ramps Improvement Project is independent of both the SFOBB East Span Seismic Safety Project, currently under construction, and the Treasure Island and Yerba Buena Island (TI/YBI) Redevelopment Plan, currently undergoing its own environmental review process.

The purpose of the project is to improve the safety of the westbound on- and off-ramps to the extent physically and economically feasible. The current ramps do not meet current Caltrans design standards. The proposed project would provide standard deceleration length for the off-ramp and improved acceleration/merging length for the on-ramp. In addition, the project would improve traffic operations to and from YBI.



Figure 1. Regional Location

Yerba Buena Island  
Ramps Improvement Project



Alternatives have been proposed to address the geometric deficiencies of the existing on- and off-ramps. In addition to the no-build alternative, the proposed build alternatives would analyze the effects to the SFOBB (I-80) mainline structure and YBI. The proposed project is located between post-mile (PM) 7.6 and 8.1<sup>1</sup> beginning at the east portal of the YBI tunnel and ending at the east side of the Transition Structure portion of the new SFOBB. The SFOBB Transition Structure is located between PM 7.9 and 8.1 between the YBI tunnel and the SFOBB Self-Anchored Suspension (SAS) span.<sup>2</sup>

Three alternatives are currently under consideration, including:

**A. No Build Alternative**

This Alternative assumes that the existing on- and off-ramps would remain in place and no further action or improvements would occur.

**B. Alternative 2b**

Alternative 2b would include removal of the existing westbound on- and off-ramps on the east side of YBI, construction of a westbound loop on-ramp from Macalla Road on the east side of YBI, and construction of a westbound off-ramp to Macalla Road on the east side of YBI (see Figure 2).

This alternative proposes to reconstruct two of the existing six on- and off-ramps at the I-80/YBI interchange. The proposed on- and off-ramps would provide standard shoulder widths, and would include the following features:

- Westbound on-ramp on the east side of YBI- This ramp would begin at a “T” intersection at Macalla Road, loop right with a tight radius, and merge on to the north side of the Bay Bridge. The length of this ramp would be approximately 876 feet (267 meters). This ramp would have two traffic lanes, merging into one as it connects to the SFOBB. One lane would be a high occupancy vehicle (HOV) lane and the other a mixed-flow<sup>3</sup> lane.
- Westbound off-ramp on the east side of YBI - This ramp would diverge from the new SFOBB Transition Structure between bents W3 and W4 curving around the Nimitz House and terminate at a “T” intersection at Macalla Road. The length of this ramp would be approximately 1,115 feet (340 meters). A stop sign is proposed at the ramp terminus.
- Macalla Road would be widened for approximately 660 feet adjacent to the terminus of the westbound on- and off-ramps. The existing roadway is about 20 feet wide near the ramp terminus. The roadway widening is required to

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<sup>1</sup> Kilometer Post (KP) 12.3 and 13.2

<sup>2</sup> The SFOBB Transition Structure is the name of a section of the new Bay Bridge. The Transition Structure will connect the Self-Anchored Suspension (SAS) span to Yerba Buena Island, and will transition the East Span's side-by-side road decks to the upper and lower decks of the YBI tunnel and West Span.

<sup>3</sup> A mixed-flow lane is a general purpose travel lane with no traffic restrictions.



accommodate a 12-foot wide multi-use pedestrian/bike path and two 12-foot wide lanes within the Caltrans right-of-way. A retaining wall would be constructed adjacent to Macalla Road to provide the required width. The height of the retaining wall would vary from 4 to 16 feet and would retain the hillside above Macalla Road. The stairway adjacent to the Caltrans Substation would be relocated to the west side of the building to make room for the new retaining wall. The roadway width would vary around the curve at South Gate Road to provide proper width for truck turning movements.

Under Alternative 2B, the westbound on- and off-ramps would terminate at Macalla Road where Quarters 10 and Building 267 are currently located.<sup>4</sup> Quarters 10 and Building 267 would be relocated prior to construction of the ramps at Macalla Road. The relocation site for these buildings would be on YBI and would be determined under the Section 106 mitigation development process.

### C. Alternative 4

Alternative 4 would include the removal of the existing westbound on- and off-ramps on the east side of YBI, construction of westbound on-ramp from South Gate Road, and construction of westbound off-ramp to Macalla Road on the east side of YBI (see **Figure 3**).

This alternative proposes to reconstruct two of the existing six on- and off-ramps at the I-80/YBI interchange. The proposed on- and off-ramps would provide standard shoulder widths, and would include the following features:

- Westbound on-ramp on the east side of YBI - This ramp would begin at South Gate Road, proceed east paralleling the eastbound on-ramp, loop under the new SFOBB Transition Structure near its eastern end to provide adequate merging distances, cross over the westbound off-ramp along the north side of the Bay Bridge. The length of this ramp would be approximately 2,883 feet (879 meters). HOV lane would not be provided under Alternative 4.
- Westbound off-ramp on the east side of YBI - This ramp would diverge from the new SFOBB Transition Structure between bents W2 and W3, parallel the Transition Structure, cross under the westbound on-ramp and terminate at a "T" intersection at Macalla Road. The length of this ramp would be approximately 1,168 feet (356 meters). A stop sign is proposed at the ramp terminus.
- Macalla Road would be widened for approximately 660 feet adjacent to the terminus of the westbound on-and off-ramps. The existing roadway is about 20 feet wide near the ramp terminus. The roadway widening is required to accommodate a 12-foot wide multi-use pedestrian/bike path and two 12-foot wide lanes within the Caltrans right-of-way. A retaining wall would be constructed

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<sup>4</sup> Quarters 10 and Building 267 (a contributing garage) are listed in the National Register of Historic Places and significant at the local level under Criterion C, as a significant example of mid-twentieth century residential architecture.



adjacent to Macalla Road to provide the required width. The height of the retaining wall would vary from 4 to 16 feet and would retain the hillside above Macalla Road. The roadway width would vary around the curve at South Gate Road to provide proper width for truck turning movements.

Under Alternative 4, Quarters 10 and Building 267 and its associated landscaping would remain in place.

The construction of the ramps is estimated to start in the spring of 2012 and be completed by spring of 2014. It is expected that construction would occur after construction of the connecting transition structure, which is included in the SFOBB East Span Seismic Safety Project. The YBI Ramps Improvement Project would utilize most of the construction easements as well as storage and stockpiling areas that were obtained for construction of the transition structure. However, extra construction easements would be needed on the north side of the SFOBB. Loaders and backhoes would be expected to perform the necessary earthwork during construction.

### **III. REGULATORY SETTING**

The primary federal law regulating water quality is the Federal Clean Water Act (CWA), issued by the U.S. Environmental Protection Agency (EPA). The EPA has delegated its authority in California to the State Water Resources Control Board (SWRCB) and Regional Water Quality Control Boards (RWQCBs). Each RWQCB prepares and adopts a Water Quality Control Plan, (Basin Plan), a master policy document for managing surface and groundwater quality throughout each respective region. The SWRCB and RWQCBs issue permits, which implement the standards included in the Basin Plan as well as other requirements of the State Water Code and the CWA (Caltrans 2007c). The YBI Ramps Improvement Project is located within the jurisdiction of the San Francisco Bay RWQCB (Region 2), which is responsible for implementation of State and Federal water quality protection laws and regulations in the vicinity of the project site.

Section 401 of the CWA requires a water quality certification from the SWRCB or RWQCB when a project: 1) requires a federal license or permit (a Section 404 permit is the most common federal permit for State of California, Caltrans projects), and 2) would result in a discharge to waters of the United States.

Section 402 of the CWA establishes the National Pollutant Discharge Elimination System (NPDES) Permit, which directs that storm water discharges are point source discharges and establishes a framework for regulating municipal and industrial storm water discharges. To ensure compliance with CWA Section 402, on July 15, 1999, the SWRCB issued the NPDES Permit, Statewide Storm Water Permit for Caltrans (Order No. 99-06-DWQ, NPDES No. CAS000003) (Caltrans 2003a). The Permit regulates storm water discharges from Caltrans properties, facilities and activities during and after construction.

Figure 2. Alternative 2B



**Alternative 2b Proposed Ramps**

- Proposed West Bound Off-Ramp
- Proposed West Bound On-Ramp
- Proposed Macalla Road Improvements

**Separate Project Currently Under Construction**

- San Francisco-Oakland Bay Bridge East Span Seismic Safety Project
- Transition Structure Portion of SFOBB

Image: Nma/USGS 2004  
Data: DMJM/Hans EDAW  
5/09

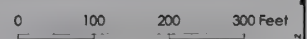









Figure 3. Alternative 4

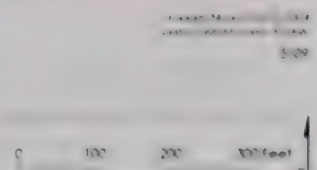


**Alternative 4 Proposed Ramps**

-  Proposed West Bound Off-Ramp
-  Proposed West Bound On-Ramp
-  Proposed Macalla Road Improvements

**Separate Project Currently Under Construction**

-  San Francisco-Oakland Bay Bridge East Span Seismic Safety Project
-  Transition Structure Portion of SFOBB





The SWRCB has also issued a Statewide Construction General Permit (General Permit) for construction activities (Order No. 98-08-DWQ, CAS000002), which applies to all storm water discharges from land where clearing, grading, and excavation result in disturbances of at least 0.4 hectares (one acre) or more. The Caltrans permit (CAS000003) requires that Caltrans implement the technical provisions of the statewide general permit for construction activities. Construction activity that results in soil disturbances of less than 0.4 hectares (one acre) are subject to the General Permit if the construction activities are part of a larger Common Plan of Development totaling 0.4 hectares (one acre) or more of soil disturbing activities, or if there is potential for significant water quality impairment resulting from the activity as determined by the RWQCB (Caltrans 2007c). All projects that are subject to the General Permit require a Storm Water Pollution Prevention Plan (SWPPP). Construction projects that disturb less than 0.4 hectares (one acre) of soil are required to incorporate a Water Pollution Control Program (WPCP). The disturbed soil area estimated for YBI Ramps Improvement Project Alternatives 2B and 4 are approximately 2.3 acres and 4.4 acres, respectively. Regardless of requirement of a SWPPP or WPCP, a Storm Water Data Report (SWDR) is required, which summarizes the storm water quality issues of a project. A SWDR was prepared February 2009 (AECOM 2009) and was used to prepare this study.

The Caltrans Project Planning and Design Guide (PPDG) provides a process for determining the need for, selecting, and incorporating feasible Best Management Practices (BMPs) into projects (Caltrans 2007b). The PPDG describes the BMP selection and design process, as well as describing relevant regulations, permits, monitoring and reporting requirements.

#### **IV. PROJECT LOCATION AND RECEIVING WATER BODIES AND GROUNDWATER**

##### **A. Storm Water**

YBI is a 147-acre natural island that sits in the San Francisco Bay between the cities of San Francisco and Oakland. YBI serves as an access point for the adjacent man-made Treasure Island. The island's high point is located 338 feet above mean sea level, and large portions of it are undeveloped, with steep wooded hillsides leading down to the shoreline. Within the project area, the area just north and south of I-80 on the far east of the project area has an 8 percent representative slope<sup>5</sup>. The area further east has a lower representative slope of 1 percent and the area west along I-80 toward the YBI Tunnel has a 40 percent representative slope. Finally, lands located further to the north and south of I-80 in the west side of the project area have a representative slope of 53 percent (USDA 2008a).

The proposed project is located in the San Francisco Bay watershed. The hydrologic sub-area information is as follows (CSU Sacramento 2008, see **Figure 4**):

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<sup>5</sup> The slope gradient is recorded as three separate values: a low value, a high value, and a "representative" value. The representative value indicates the expected value.

- Hydrologic unit: Bay Bridges
- Hydrologic area: Bay Waters
- Hydrologic sub-area: Undefined, Sub-area 203.10
- Watershed area: 21,461 hectares (53,031 acres)
- Average annual rainfall: 536 millimeters (21.1 inches).

### ***Existing Drainage***

The existing project site is located in a developed area surrounded by the San Francisco Bay. The existing areas include vegetation on moderate to steep slopes, as described above. In general, YBI's soil classification is dense to very dense silty sand with an infiltration rate that varies between 5.1 and 20 centimeters per hour (2 to 8 inches per hour) (AECOM 2009). Two soil groups exist within the project area; soil groups C and D. Hydrologic soil group C comprises approximately 20 percent of the project area of interest and is characterized as having a slow infiltration rate. Hydrologic soil group D which comprises approximately 80 percent of the project area is characterized as having a very slow rate of water infiltration (high runoff potential) and consists chiefly of clays.

Unlike most of mainland San Francisco, Treasure Island and YBI are served by separate storm water and wastewater systems (SFPUC 2004, p.8). As a result, surface runoff from the project area flows untreated to the San Francisco Bay via the San Francisco Municipal Separate Storm Sewer System (MS4). The MS4 within the project area is not connected to San Francisco city's MS4 or combined sewer systems.

### ***Surface Water Quality***

The San Francisco Estuary Institute (SFEI) conducts the Regional Monitoring Program (RMP) for water quality in the San Francisco Estuary. The RMP monitors contaminant concentrations in water, sediment, and fish and shellfish tissue in San Francisco Bay and the Delta. The RMP has been conducting long-term monitoring for over 15 years. **Table 1** presents a summary of the concentrations of various pollutants in the Central San Francisco Bay, monitored in 2006 (SFEI 2009). The Yerba Buena Station (sampling site BC10) is located near the project area.

### ***Beneficial Uses***

The Region 2 Basin Plan (SFBRWQCB 2007) establishes beneficial uses for waterways and water bodies within the Central Basin in San Francisco County. The existing beneficial uses for San Francisco Bay Central area include: industrial service water supply; industrial process supply; ocean, commercial, and sport fishing; shellfish harvesting; estuarine habitat; fish migration; preservation of rare and endangered species; fish spawning; wildlife habitat; water contact recreation; noncontact water recreation; and navigation.

### ***303(d) List of Water Impairments and Total Maximum Daily Loads (TMDLs)***

The San Francisco Bay is listed as impaired on the CWA Section 303(d) list for Chlordane, DDT, Dieldrin, Mercury, Polychlorinated Biphenyls (PCBs), PCBs (dioxin-like), Selenium, Polycyclic Aromatic Hydrocarbons (PAHs), Dioxin compounds, Furan compounds, and Exotic species. Total Maximum Daily Loads (TMDLs) are a calculation

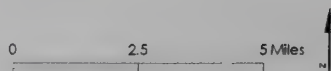


Figure 4. Hydrologic Area



Central Basin

Bay Waters Hydrologic Area





**Table 1. Central San Francisco Bay Surface Water Concentrations from Sampling Site BC10, August 2006**

Parameter	Dissolved	MDL	Units	Total	MDL	Units	Water Quality Objective
Salinity	29.543	2	psu	29.7	0.16	ppt	Controllable water quality factors shall not increase salinity of waters so as to adversely affect beneficial uses.
Ammonia	0.123257	0.001875	mg/L	NA	NA	NA	Annual Mean 0.025 mg/L, Max = 0.16 mg/L
DOC	1247.658	51.57674	µg/L	NA	NA	NA	No objective
Nitrate	0.198062		mg/L	NA	NA	NA	No objective
Nitrite	0.008425	0.000532	mg/L	NA	NA	NA	No objective
Phosphate	0.071735	0.001057	mg/L	NA	NA	NA	No objective
Arsenic (As)	1.44	0.08	µg/L	1.44	0.08	µg/L	4-day ave. 36.0 µg/L, 1-hr ave. 69.0 µg/L
Cadmium (Cd)	0.058937	0.000216	µg/L	0.06052	0.000216	µg/L	4-day ave. 9.3.0 µg/L, 1-hr ave. 42.0 µg/L
Copper (Cu)	1.035167	0.010588	µg/L	1.252406	0.010588	µg/L	4-day ave. 3.1 µg/L, 1-hr ave. 4.8 µg/L
Mercury (Hg)	0.000295	0.000127	µg/L	0.006018	0.000127	µg/L	4-day ave. 0.025 µg/L, 1-hr ave. 2.1 µg/L
Nickel (Ni)	0.937488	0.01876	µg/L	1.484922	0.01876	µg/L	4-day ave. 8.2 µg/L, 1-hr ave. 74.0 µg/L
Lead (Pb)	0.006483	0.001016	µg/L	0.220943	0.001016	µg/L	4-day ave. 8.1 µg/L, 1-hr ave. 210.0 µg/L
Selenium (Se)	0.069	0.018	µg/L	0.055	0.018	µg/L	Selenium criteria were promulgated for all San Francisco Bay/Delta waters (SFBRWQCB 2007).
Zinc (Zn)	0.432648	0.029593	µg/L	1.296622	0.029593	µg/L	4-day ave. 5.0 ug/L, 1-hr ave 20 ug/l
Conductivity	NA	NA	NA	45670	1000	µmhos/cm	4-day ave. 81.0 µg/L, 1-hr ave. 90.0 µg/L
Dissolved Oxygen (DO)	NA	NA	NA	6.91	0.3	mg/L	No objective
Temperature	NA	NA	NA	18	0.1	°C	5.0 mg/L minimum Elevated temperature waste discharges shall comply with limitations necessary to assure protection of beneficial uses. The maximum temperature of waste discharges shall not exceed the natural temperature of the receiving waters by more than 20°F. Thermal waste discharges having a maximum temperature greater than 4°F above the natural temperature of the receiving water are prohibited. (SWRCB 1998).
pH	NA	NA	NA	7.81	0.01	pH	pH shall not be depressed below 6.5 nor raised above 8.5. Controllable water quality factors shall not cause changes greater than 0.5 units in normal ambient pH levels.

Yerba Buena Island Ramps Improvement Project  
Water Quality Report

Parameter	Dissolved	MDL	Units	Total	MDL	Units	Water Quality Objective
Notes: NA = not available/not applicable; MDL = method detection limit; psu = practical salinity unit; ND = non-detect; SCT = Salinity/Conductivity/Temperature Meters; ppt = parts per trillion; mg/L = milligram per liter; µg/L = microgram per liter; ng/L = nanogram per liter; µmhos/cm = micromhos per centimeter Source: SFEI 2009; SFBWQCB 2007; SWRCB 1998.							

of the maximum amount of a pollutant that a waterbody can receive and still safely meet water quality standards.

TMDLs for the San Francisco Bay have been established based on the 2006 303(d) list (approval date: June 28, 2007). TMDLs have only been established at this time for mercury and PCBs<sup>6</sup>; all of the other pollutants listed in the 2006 303(d) list have not been completed. The San Francisco Bay RWQCB has also recommended the San Francisco Bay (Central) shoreline for placement on the 303(d) list for trash impairment (SFBRWQCB 2008, p. 15).

### ***Existing Contamination***

Along with other islands on San Francisco Bay, YBI has been used for military purposes over the years. Naval Station Treasure Island was decommissioned in 1997; however, USCG activity continues on YBI. Based on current and previous environmental investigations, several areas of known and potential contaminant sources have been identified on YBI (AECOM 2009). At the high portion of the North-east Point on YBI, elevated levels of beryllium, lead, and pesticides have been detected. Along the entire shadow area of the existing bridge and adjacent ramps, investigations indicate a potential for lead contamination in surficial soils. Petroleum hydrocarbons were also found at a former gas station and adjacent fire station, both of which have been demolished. Petroleum hydrocarbons have also been found at an active underground storage tank (Leaking Underground Storage Tank or LUST). In addition, it has been established that there is petroleum hydrocarbon contamination in the groundwater. There is also probable Aerially Deposited Lead (ADL) contamination, primarily from tailpipe emissions, in the unpaved areas adjacent to the existing roadway.

The Site Management Plan for the Naval Station Treasure Island (Tetra Tech EM Inc. 2008) reflects the Navy's current strategies and schedules to achieve site closure at several sites on Naval Station Treasure Island. This plan indicates that environmental closeout schedules and site closure for Installation Restoration (IR) Sites 8, 11, and 29 as well as inactive fuel line YF3 may be impacted by construction activities related to the SFOBB and YBI Ramps Improvement Project. Site 8 is located on the northeast end of YBI and was used as an army sludge disposal area from the wastewater treatment plant for approximately 8 years between 1968 and 1976. Metals and pesticides have been identified as the contaminants of concern. Site 11 had been used as a landfill and contaminants of concern at this site include total petroleum hydrocarbons (TPH), polycyclic aromatic hydrocarbons (PAHs), volatile organic compounds (VOCs), and metals. Site 29 is located below and parallel to the SFOBB from the northeastern portion of YBI westward to the YBI tunnel. Site 29 contains lead due to maintenance of ramps (i.e., use of lead-based paint) as well as a result of vehicle emissions. An interim remedial investigation (RI) report for Sites 8 and 29 is being finalized and the RI report for Site 11

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<sup>6</sup> On February 13, 2008, the San Francisco Bay RWQCB adopted an amendment incorporating a TMDL and associated implementation plan for PCBs in San Francisco Bay into the Water Quality Control Plan for the San Francisco Bay Basin (Basin Plan). The amendment must still be approved by the State Water Resources Control Board, the state Office of Administrative Law, and EPA.



is in the process of being prepared. The estimated year for site closeout for all three sites is 2021.

Fuel pipelines once crossed Naval Station Treasure Island to transport gasoline, diesel, bunker C fuel, and other petroleum products. The majority of the pipeline system has been removed or abandoned in place; however, there are portions of the pipeline system where additional corrective actions are expected include the YF3 and USCG sites, which are both located on the northeast side of YBI (Tetra Tech EM Inc. 2008).

## **B. Groundwater**

The project area is located in the Coast Range geomorphic province. The San Francisco Bay Area is underlain by various Quaternary sedimentary units, which are in turn, underlain by the Jurassic and Cretaceous age bedrock of the Franciscan Complex. YBI is composed of Franciscan Formation bedrock, which has been uplifted to the surface (AGS 2007 p. 5).

YBI does not have an existing designated groundwater basin in the Basin Plan. In general, groundwater is not likely to be encountered during the dry season, but it may be encountered during the rainy season near the interface between the soil and rock. Boring logs did not indicate if the depth to groundwater was measured in any of the borings; however, four borings were classified as “wet”, which indicates that it was saturated, two borings were classified as “dry to damp” and all other borings classified the material overlying the bedrock as “moist.” Relatively shallow groundwater conditions may be encountered in the project area, especially in the lower elevation areas of YBI where the westbound on- and off-ramps are proposed (AGS 2007 p.7).

Due to the absence of long-term monitoring of water levels, the natural groundwater depth is uncertain. The Packer testing<sup>7</sup> indicated that the bedrock was nearly impermeable below the weathered zone and therefore water introduced into the boreholes and in fractures of this material is not likely to drain away. This leaves the possibility that the measured water depths are not normal and the natural groundwater table should generally be expected near adjacent Bay levels. The ongoing Project Approval and Environmental Document (PA&ED) phase will determine the natural groundwater depth.

## **V. WATER QUALITY IMPACTS**

### **A. Storm Water**

Caltrans has performed many studies to monitor and characterize highway storm water runoff throughout the State. Commonly found pollutants throughout the State are Total Suspended Solids (TSS), nitrate nitrogen, Total Kjeldahl Nitrogen (TKN), phosphorous, orthophosphate, copper, lead and zinc (Caltrans 2007c). Some sources of these pollutants

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<sup>7</sup> Packer tests consist of isolating specific sections of a bedrock borehole so that water-quality samples can be collected and aquifer tests can be conducted. A series of such tests allows definition of the vertical distribution of water quality (usually contaminants) and hydraulic conductivity (pathways for water and contaminant movement) in an aquifer.

are natural erosion, phosphorus from tree leaves, combustion products from fossil fuels, and the wearing of break pads.

The westbound lanes of the new SFOBB as it approaches YBI would transition to a stacked configuration over the eastbound lanes. The proposed YBI ramps would connect to the high point of the westbound alignment located on this bridge. The SFOBB structures would be comprised of multi-cell cast-in-place concrete box girders. The structure depth would vary from approximately 1.8 to 5.9 meters (5.5 to 18 feet) (Caltrans 2000, p. 38). The current design of the proposed YBI ramp structures incorporates piped inlets directing storm water flows down the columns and into the Bay (Caltrans 2000, p. 38). The proposed drainage system would collect concentrated flows from the elevated ramp structures using inlets, storm drain pipes, and downdrain trenches and convey the runoff to the BMPs for treatment. After treatment runoff will be conveyed to the existing west tie-in drainage system (AECOM 2009). The existing ramps on YBI do not have any cross drains and the proposed YBI ramps do not include the construction of any new cross drains. Temporary (construction-related) and permanent drainage and treatment best management practices (BMPs) are currently in the conceptual design stage, as described in Section VI.

The project would be one of the three alternatives; either the No Build or one of two proposed build-alternatives. In both Alternatives 2B and 4, the soil disturbances are limited to the construction of roadway embankments at ramp termini, structural excavations for column foundations, wall foundations, backfill for required retaining walls, and unpaved property for use as contractor lay-down area.

Alternatives for the YBI Ramps Improvement Project include the replacement of existing westbound on- and off-ramps located in two different configurations, or a no build alternative.

- **No Build:** The No Build assumes that the existing ramps would remain in place. This alternative would have water quality impacts due to continuing congestion, which may increase with the proposed Treasure Island Redevelopment Plan, which includes 6,000 units, approximately 270,000 square feet of neighborhood-serving and visitor-oriented retail, and 500 hotel rooms. At build out, there is expected to be a net increase of 1,664 vehicles during the morning peak hour and 2,909 vehicles during the afternoon peak hour (CHS Consulting Group 2009). Vehicles waiting to enter I-80 westbound would continue deposition of particulates from exhaust and heavy metals from braking. Continued traffic safety deficiencies and accident rates higher than the statewide average rates (Caltrans 2007a, p. 11) would also be anticipated to continue and contribute to water quality impacts due to oil spills and discharge or spill of other pollutants during collision. Storm water would continue to discharge untreated into the San Francisco Bay.

Both build alternatives would increase the surface area exposed to precipitation and have a corresponding increase in the quantity of pavement storm water runoff during rainfall events. The proposed project is currently in the conceptual design stage; however, storm



drain systems would be sized to handle the increase in runoff due to additional paved surface. As described above for the No Build Alternative, Alternatives 2B and 4 would have water quality impacts related to the net increase estimated future vehicle volumes (CHS Consulting Group 2009).

- **Alternative 2B:** Would include the removal of the existing westbound on- and off-ramps on the east side of YBI, the construction of a westbound off-ramp to Macalla Road on the east side of YBI, and construction of a westbound hook on-ramp from Macalla Road on the east side of YBI. The disturbed soil area estimated for Alternative 2B is approximately 2.3 acres. The disturbed soil area is the area from the edge of the pavement to the construction limits created by the cut and fill slopes. The disturbed soil area does not include the paved ramp area. This alternative would have less water quality impacts than Alternative 4 due to less disturbed soil area and less amount of impervious area added to YBI. The amount of impervious area would increase from an existing 8.47 acres to 10.42 acres, a change of 1.95 acres. The percent of impervious area is expected to increase from 47% to 58% for the project site. Pervious area is the difference between the total area and impervious area within the project right-of-way. The surface runoff from Alternative 2B would be collected to the outfall near Macalla Road and treated in a BMP which is yet to be determined. It is anticipated, however, that detention devices, lined biofiltration swales, and media filters would be used to treat runoff prior to discharge (as identified below in Section VI). For Alternative 2B, the required water quality treatment flow was calculated as approximately 0.0214 cubic meter per second ( $\text{m}^3/\text{s}$ ). The required water quality treatment volume was calculated to be 119 cubic meters ( $\text{m}^3$ ) (AECOM 2009; see Attachment 1).
- **Alternative 4:** Would include the removal of the existing westbound on- and off-ramps on the east side of YBI, the construction of westbound on-ramp from Hillcrest Road, and construction of westbound off-ramp to Macalla Road on the east side of YBI. Alternative 4 would have the most water quality impacts of the three alternatives. The disturbed soil area estimated for Alternative 4 is approximately 4.4 acres, as it has the largest soil disturbance area, the largest increase in impervious area, and construction work would be required closer to San Francisco Bay. The amount of impervious area would increase from an existing 6.34 acres to 10.74 acres, a change of 4.40 acres. The percent of impervious area is expected to increase from 59% to 100% for the project site. Surface runoff from the northern half of this alternative would be collected at the outfall near Macalla Road. Surface runoff from the southern portion of this alternative would be collected to the outfall near South Gate Road. The location and types of BMPs that would be used to treat this surface runoff are in the conceptual design state and would be developed in detail at a future time; however, it is anticipated that detention devices, lined biofiltration swales, and media filters would be used to treat runoff prior to discharge (as identified below in Section VI). For Alternative 4, the required water quality treatment flow was



calculated as approximately  $0.0242 \text{ m}^3/\text{s}$ . The required water quality treatment volume was calculated to be  $267 \text{ m}^3$  (AECOM 2009; see Attachment 1).

An integrated bridge and ramp drainage system would be designed and constructed within the YBI Ramps Improvement Project limits to collect all storm water runoff. An independent ramp drainage system would be designed and constructed to collect all ramp surface runoff. For all slopes, benching, rounding, and terracing would be considered to minimize concentrated flows and slope stabilization measures and retaining walls may be needed. In addition, slopes would include pipe or flume downdrains to collect concentrated flows, minimize erosion, and direct storm water into the proposed drainage system for treatment (AECOM 2009). The need for slope stabilization and possible retaining walls would be determined as the project progresses. In addition, slopes would include concrete side drains to collect concentrated flows, minimize erosion, and direct storm water in the proposed drainage system and acceptable BMPs, which would eventually terminate into San Francisco Bay.

The pollutant load from the proposed YBI ramp area is negligible when compared to the overall pollutant loadings to the San Francisco Bay from the entire watershed and would not have a net impact on the overall water quality in San Francisco Bay. San Francisco Bay is listed as impaired for a number of pollutants outlined in Section IV.A above; however, only mercury (under the Caltrans general metals category) is listed on the Caltrans targeted design constituent (TDC) list. Thus, treatment BMPs for consideration include those used to treat general metals/general purpose pollutants. Temporary construction site BMPs, permanent design pollution BMPs, and permanent treatment BMPs, would be required to minimize or prevent impacts on water quality and pollutant loading, particularly during times of large flood flow runoff. Suggested BMPs are described below in Section VI. The total mass of storm water pollution is not expected to change as a result of the project since the total usage hours are not expected to increase and the pollutant generation rate is not expected to increase (Caltrans 2001, p. 4-68).

## **B. Groundwater**

Groundwater may be encountered during construction. At this time, excavated spoils would be considered hazardous along with any groundwater encountered and would require appropriate collection, testing, and if applicable, transport offsite for treatment and disposal.

# **VI. AVOIDANCE, MINIMIZATION AND/OR MITIGATION MEASURES**

## **A. Section 401 of the Clean Water Act**

There are potential Waters of the U.S. onsite; however, verification has not yet been completed by the U.S. Army Corps of Engineers regarding if they are considered jurisdictional. If it is determined that there would be impacts to existing wetlands and Waters of the U.S. within the project limits, an Army Corps 404 permit would be required along with a 401 Water Quality Certification from Region 2.

Avoidance and minimization efforts including BMPs to avoid discharge to waters of the U.S. have been considered and described in the Natural Environment Study (NES) as well as in this Water Quality Report. Impacts to Water of the U.S. and appropriate mitigation measures would be described in the Environmental Impact Statement/Environmental Impact Report (EIS/EIR) for the Yerba Buena Island Ramps Improvement Project.

#### **B. Section 402 of the Clean Water Act**

According to the Caltrans NPDES and General Permits, Best Management Practices (BMPs) would be incorporated into the proposed project to reduce the discharge of pollutants during and after construction to the Maximum Extent Practicable (MEP). These BMPs fall into three categories, temporary Construction Site BMPs, permanent Design Pollution Prevention BMPs, and permanent Treatment BMPs.

##### **(1) Temporary Construction Site BMPs**

Construction Site BMPs are implemented during construction activities to reduce pollutants in storm water discharges throughout construction. Planning would consider scheduling and construction timing to schedule major grading operations for the non-winter season when practical and minimize the active construction area during the rainy season. Temporary concrete washouts, stabilized construction entrances/exits, silt fences, sand bag barriers, gravel bag berms, and fiber rolls may be used as temporary construction site BMPs. Additional items may be identified as the project design phase advances. Dewatering would not likely be necessary for project construction of the cast-in-drilled holes (CIDH) piles; however, if required, at this time, it is assumed that the excavated spoils from the piles would be considered hazardous. Any hazardous water and spoils would be collected appropriately, tested, and transported offsite for treatment and disposal. Proper handling and disposal methods would be determined based on the background chemical levels in groundwater and the typical chemical constituents expected from construction activities.

To minimize any additional groundwater contamination resulting from construction activities, inspection of vehicles and equipment would be conducted, spill prevention and prompt spill response would be practiced, absorbent materials would be used to contain any spills, and the proper officials would be contacted in the case of a spill. Materials associated with construction activities would also be delivered and stored using practices that prevent these materials from polluting receiving waters. Vehicle and equipment maintenance would occur off-site whenever practical, but when occurring on-site, drip plans or absorbent pads would be used and all maintenance areas would be required to have spill kits or other spill protection devices. For pile driving operations, pile driving areas and equipment would be inspected for leaks and spills on a daily basis and when not in use, store pile driving equipment away from concentrated flows or storm water (Caltrans 2003b).

Solid construction wastes would be contained, stored, and disposed of using practices that minimize contact with storm water. Adequate trash receptacles and dumpsters would be



provided to contain litter and construction waste. Solid waste will not be collected near drainage inlets or receiving waters and should be covered to avoid conveyance of waste due to wind or water. In addition, temporary sanitary facilities should not be located near drainage facilities or receiving waters, nor should they be located in areas that will collect water.

Wind erosion controls would also be implemented to minimize dust and transportation of waste. Wind erosion controls could include covering of stockpiles and waste receptacles, the use of hydroseeding, soil binders or geotextiles on stockpiles, as well as applying of water or dust palliatives to stabilize stockpiles, roadways, or work areas.

Grading of existing slopes would be required for both proposed build alternatives. The existing site condition includes varying slopes that are either vegetated or has exposed rocks. Minor clearing and grubbing would be required within the project area. Existing vegetation would be preserved to the extent possible and clearly marked to minimize erosion potential and runoff velocities. The project's environmentally sensitive areas (ESAs), including several mature trees, would be protected with bright orange "ESA" fences. The use of retaining structures, especially in excavation areas, would minimize the amount of grading required. Imported fill would be used to create the project ramps terminus and may be retained with walls, and in other cases the ramps would include side slopes of 1V:4H. Temporary silt fence, stockpile cover, installation of temporary barriers around stockpiles to prevent contact with storm water, stabilized construction entrance/exit and temporary soil stabilizers are some of the temporary erosion and water pollution control measures that would be utilized in combination to prevent and minimize soil erosion and sediment discharges during construction.

Erosion controls such as netting or soil stabilization fabrics in combination with hydroseeding would be implemented to facilitate the establishment of permanent vegetation at the end of construction. The biodegradable netting is effective in providing good initial mechanical protection while seed applied during the hydroseeding operation germinates and establishes itself.

As the new cut and fill slope areas have been established, vegetation strategies and the soil erosion control plans will be prepared. The District Landscape Architect and Maintenance Storm Water Coordinator will be consulted during the development of these plans. Vegetating hillside slopes with deep rooted plants is recommended to help stabilize the soil (AECOM 2009).

Given a projected disturbance of greater than 0.4 hectares (one acre), a SWPPP would be developed prior to construction. This dynamic document addresses the deployment of various erosion and water pollution control measures that are required commensurate to changing construction activities. The purpose of the SWPPP would be to identify pollutant sources that may affect the quality of the storm water discharges associated with the construction activities of the project and to identify, construct, and implement storm water pollution control measures to reduce pollutants in storm water discharges from the construction site during and after construction.



## (2) Permanent Design Pollution Prevention BMPs

Design Pollution Prevention BMPs are permanent measures to improve storm water quality and include measures to stabilize disturbed soil areas and maximize vegetated surfaces, thereby reducing runoff and erosion. Erosion control measures would be provided on all disturbed areas. As earlier noted, the use of retaining wall structures would minimize the amount of open disturbed soil. Following construction, the final slopes would be vegetated with an approved Caltrans seed mix. Re-establishment of permanent vegetation cover provides erosion control. In addition, slopes will include pipe or flume downdrains to collect concentrated flows, minimize erosion, and direct storm water into the proposed drainage system for treatment (AECOM 2009).

## (3) Permanent Treatment BMPs

The PPDG Section 4 (Caltrans 2007b) describes the process for determining the need for permanent treatment BMPs. As the YBI Ramps Improvement Project will discharge water into surface waters that have TMDLs and other pollution controls, as described in Section IV, treatment BMPs are required. In addition, the project is within an urban MS4 area and would cause a change to historic drainage patterns. The project would also indirectly discharge surface runoff into the San Francisco Bay, and is considered a major reconstruction project<sup>8</sup> resulting in a net increase of greater than one acre of new impervious surface. According to the PPDG evaluation process, this project must consider permanent treatment BMPs. The TMDL established for mercury, as described in Section IV, will affect the selection of permanent treatment BMPs.

Treatment BMPs are permanent devices and facilities that treat storm water runoff. Caltrans-approved Treatment BMPs include Biofiltration Systems (Biofiltration Strips and Swales), Infiltration Basins, Detention Basins, Traction Sand Traps, Dry Weather Flow Diversions, Media Filters, Gross Solids Removal Devices (GSRDs), Multi-Chamber Treatment Trains, and Wet Basins. Those most feasible in the Bay Area are Biofiltration Systems, Infiltration Basins, Detention Basins, Dry Weather Flow Diversions, Media Filters, and Multi-chamber Treatment Trains. The selected treatment BMPs have been identified in the project's SWDR (AECOM 2009).

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<sup>8</sup> As defined in the Storm Water Quality Handbook (Caltrans 2007b), new construction and major reconstruction includes new routes, route alignments, and route upgrades. New construction activity does not include routine maintenance to maintain original line and grade, hydraulic capacity, or original purpose of the facility, nor does it include emergency construction activities required to protect public health and safety. New Construction and major reconstruction projects may include, but are not limited to: new highways and freeways; highway-related facilities, including new or reconstructed maintenance facilities, safety roadside rest areas, toll plazas and inspection and weigh stations; adding one or more lanes; adding HOV lanes; construction activities conducted within highway rights-of-way in conjunction with a new facility; new or reconstructed interchanges, including on-ramps, off-ramps, and connectors; new or reconstructed bridges; tunnels; and drainage system improvements, including changes to pipes, conduits, channels, etc.

The SWDR identified Infiltration Devices as infeasible for the project site, as portions of the project site are known to have hazardous soil and contaminated groundwater. In addition, the impermeable soil found at the project site restricts opportunities for the use of infiltration devices (AECOM 2009). Multi-chamber Treatment Trains are also not appropriate at this project, as this project does not fall into any of the relevant categories (vehicle service facilities, parking areas, paved storage areas, or fueling stations). In addition, since dry weather flow diversions address non-storm water flows only, Dry Weather Flow Diversions are not recommended.

Detention Devices and Media Filters were evaluated as possible types of permanent Treatment BMPs. Detention Devices are effective at removing total suspended solids (TSS), phosphorus, particulate metals, and litter by temporarily detaining storm water runoff to allow sediment and particulates to settle out before it is discharged. Media Filters, specifically the Austin Vault Sand and Delaware Sand filters, are effective at removing general purpose pollutants. Both Detention Devices and Media Filters may require an impermeable lining to avoid leaking into potentially contaminated groundwater. Right-of-way concerns as well as the cost of these two permanent treatment BMPs were also considered to be issues in the PA&ED evaluation. However, Biofiltration Systems were identified as the favored permanent treatment BMP option.

Biofiltration swales are effective at removing general purpose pollutants. The site conditions and climate are favorable to allow suitable vegetation to be established. The SWDR indicates that biofiltration swales should be considered as a permanent water quality treatment BMP for the project (AECOM 2009). If biofiltration swales are included, consultation with the Regional/District NPDES coordinators would be necessary to discuss how to proceed since the site contains hazardous soil. Use of impermeable liners and an underdrain may be required to prevent contact with existing hazardous soils and contaminated groundwater. The draft drainage plan provided in the SWDR indicates that for both build alternatives, a biofiltration swale would extend north from the ramps, terminating in the bay (AECOM 2009). During the design phase, the feasibility of using biofiltration swales will be further investigated.

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**Attachment 1 (AECOM 2009)**

**Project: I-80 On and Off Ramp Improvement Funded by SFCTA**

AECOM

**Alt 2B**

	acre	m <sup>2</sup>
Total Site Area	17.95	72641
Pervious Area	9.48	38360
Impervious Area	10.42	42199
Existing impervious Area	8.47	34281
Increased impervious area	1.95	7918
Total Disturbed Soil Area	2.29	9267

**Total Water Tributary Area for Alt 2B**

	acre	m <sup>2</sup>
Onsite Tributary Area	3.89	15756
Offsite Tributary Area	0.00	0
Total Tributary Area	3.89	15756

**Alt 4**

	acre	m <sup>2</sup>
Total Site Area	10.74	43480
Pervious Area	0.00	0
Impervious Area	10.74	43480
Existing impervious Area	6.34	2564
Increased impervious area	4.40	17816
Total Disturbed Soil Area	4.40	17816

**Total Water Tributary Areas for Alt 4**

	acre	m <sup>2</sup>
On Site Tributary Area	4.40	17816
Offsite Tributary Area	0.00	0
Total Tributary Area	4.40	17816

Note: (1) surface runoff from the outside of the Right of Way (RW) to the project site is collected to the proposed Caltrans drainage system  
(2) Onsite tributary area is defined as the area that the runoff collected from the roadway within the RW.

(3) Offsite tributary area is defined as the area that surface runoff is collected from the unpaved area within the RW and contributed to the treatment BMPs

## Project: I-80 On and Off Ramp Improvement Funded By SFCTA

AECOM

### Water Quality Flow (WQF) for Alt 2B

Method: Rational Method

$$Q=0.28 \cdot C \cdot I \cdot A$$

Where

Q is a surface runoff,  $m^3/s$  (Q would be the WQF from the area that discharge flow to flow based treatment BMPs.)

C is runoff coefficient, dimensionless

I is a rainfall intensity, mm/hr

A is a water tributary area,  $km^2$

Calculation:

Where:

$$c=0.95$$

$$I=5.1 \text{ mm/hr (Ref. 1)}$$

$$A=0.015756 \text{ km}^2 \text{ (3.89 ac)}$$

$WQF = 0.0214 \text{ m}^3/s$
$0.755 \text{ cfs}$

### Water Quality Flow (WQF) for Alt 4

Method: Rational Method

$$Q=0.28 \cdot C \cdot I \cdot A$$

Where

Q is a surface runoff,  $m^3/s$  (Q would be the WQF from the area that discharge flow to flow based treatment BMPs.)

C is runoff coefficient, dimensionless

I is a rainfall intensity, mm/hr

A is a water tributary area,  $km^2$

Calculation:

Where:

$$c=0.95$$

$$I=5.1 \text{ mm/hr (Ref. 1)}$$

$$A=0.028763 \text{ km}^2 \text{ (4.40 ac)}$$

$WQF = 0.0242 \text{ m}^3/s$
$0.854 \text{ cfs}$

Reference

1. Caltrans May 2007 Storm Water Quality Handbooks: Project Planning and Design, pg 2-18 Section 2



## Project: I-80 On and Off Ramp Improvement Funded By SFCTA

AECOM

### Water Quality Volume (WQV) for Alt 2B

Method: Maximized Volume Method

$$WQV = A \times I$$

Where:

WQV is a water quality volume, m<sup>3</sup>

A is a water tributary area to the proposed treatment BMPs, m<sup>2</sup>

I is a rainfall depth per area, m<sup>2</sup>-m

Calculation:

Where: I is calculated as 0.015m<sup>2</sup>-m from basin size 1.4 using

Drawdown Time (Hours) 48

Runoff Coefficient 0.8

A is 7918, m<sup>2</sup>

$$WQV = 7918 \times 0.015$$

$$119 \text{ m}^3$$

### Water Quality Volume (WQV) for Alt 2B

Method: Maximized Volume Method

$$WQV = A \times I$$

Where:

WQV is a water quality volume, m<sup>3</sup>

A is a water tributary area to the proposed treatment BMPs, m<sup>2</sup>

I is a rainfall depth per area, m<sup>2</sup>-m

Calculation:

Where: I is calculated as 0.015m<sup>2</sup>-m from basin size 1.4 using

Drawdown Time (Hours) 48

Runoff Coefficient 0.8

A is 28763, m<sup>2</sup>

$$WQV = 17816 \times 0.015$$

$$267 \text{ m}^3$$

Reference:

1. Caltrans May 2007 Storm Water Quality Handbooks: Project Planning and Design, pg 2-19 Section 2

**APPENDIX L**  
**AIR QUALITY ANALYSIS**





## Memorandum

To Ed Pang Page 1

CC

Subject Yerba Buena Island Ramps Improvement Project EIR/EIS  
Air Quality Analysis Addendum

From Debra Lilly

Date July 12, 2010

The following revisions are hereby made by addendum to the Final Air Quality Analysis, dated December 2009, based on recent comments from Caltrans Headquarters.

The following text has been added to the end of the second paragraph on page 34 in the Air Quality Analysis:

Concurrence with this determination must be obtained from all federal state, and local agencies with an air quality regulatory responsibility.

Table 1 on page 19 has been revised as follows:

**Table 1: Summary of Annual Ambient Air Quality Data<sup>1</sup>**

	2006	2007	2008
<b>OZONE</b>			
Maximum concentration (1-hour/8-hour, ppm)	0.053/0.046	0.060/0.053	0.082/0.066
Number of days state standard exceeded (1-hour/8-hour)	0/0	0/0	0/0
Number of days national standard exceeded (8-hour) <sup>2</sup>	0	0	0
<b>CARBON MONOXIDE (CO)</b>			
Maximum concentration (1-hour/8-hour, ppm)	2.7/2.09	2.5/1.60	2.1/2.29 1.5 <sup>3</sup>
Number of days state standard exceeded (8-hour)	0	0	0
Number of days national standard exceeded (1-hour/8-hour)	0/0	0/0	0/0
<b>NITROGEN DIOXIDE (NO<sub>2</sub>)</b>			
Maximum concentration (1-hour, ppm)	0.107	0.069	0.062
Number of days state standard exceeded	0	0	0
Annual average (ppm)	0.016	0.016	0.016
<b>SULFUR DIOXIDE (SO<sub>2</sub>)</b>			

	2006	2007	2008
Maximum concentration (24-hour, ppm)	0.007	0.006	0.004
Number of days state standard exceeded	0	0	0
Number of days national standard exceeded	0	0	0
<b>FINE PARTICULATE MATTER (PM<sub>2.5</sub>)</b>			
Maximum concentration (µg/m <sup>3</sup> ) (National/California <sup>4</sup> )	54.3/54.3	45.2/45.2	29.4/39.2
Number of days national standard exceeded (measured/calculated <sup>5</sup> ) <sup>6</sup>	3/3.1	5/5.1	0/—
State annual average (µg/m <sup>3</sup> ) (National/California)	9.79.6/9.7	8.78.6/8.9	—/11.7
<b>RESPIRABLE PARTICULATE MATTER (PM<sub>10</sub>)</b>			
Maximum concentration (µg/m <sup>3</sup> ) (National/California <sup>4</sup> )	58.0/61.4	65.7/69.8	41.2/41.3
Number of days state standard exceeded (measured/calculated <sup>5</sup> )	3/17.3	2/12.0	0/0.0
Number of days national standard exceeded (measured/calculated <sup>5</sup> )	0/0.0	0/0.0	0/0.0
State annual average (µg/m <sup>3</sup> ) (National/California)	22.0/22.9	20.9/21.821.9	21.1/20.021.9

Notes: µg/m<sup>3</sup> = micrograms per cubic meter; ppm = parts per million; — = data not available

<sup>1</sup> Measurements were recorded at the Arkansas Street monitoring station.

<sup>2</sup> The 8-hour national ozone standard was revised to 0.075 ppm in March 2008. Statistics shown are based on the previous 0.08 ppm standard.

<sup>3</sup> Both 1-hour and 8-hour CO concentrations for 2008 were obtained from USEPA because of an inconsistency between USEPA-reported 1-hour concentrations and ARB-reported 8-hour concentrations. For all other years, 8-hour CO concentrations were obtained from ARB and 1-hour CO concentrations from USEPA.

<sup>4</sup> State and national statistics may differ for the following reasons: State statistics are based on California-approved samplers, whereas national statistics are based on samplers using national reference or equivalent methods. State and national statistics may therefore be based on different samplers. State statistics are based on local conditions while national statistics are based on standard conditions. State criteria for ensuring that data are sufficiently complete for calculating valid annual averages are more stringent than the national criteria.

<sup>4</sup> Measured days are those days that an actual measurement was greater than the level of the state daily standard or the national daily standard. Measurements are typically collected every 6 days. Calculated days are the estimated number of days that a measurement would have been greater than the level of the standard had measurements been collected every day. The number of days above the standard is not necessarily the number of violations of the standard for the year.

<sup>6</sup> The national PM<sub>2.5</sub> 24-hour standard was revised from 65 µg/m<sup>3</sup> to 35 µg/m<sup>3</sup> in 2006. Statistics shown are based on the 65 µg/m<sup>3</sup> standard.

Sources: ARB 2009a; USEPA 2009a

The third paragraph on page 20 in the Air Quality Analysis has been revised as follows:

The NAAQS (other than ozone, PM<sub>10</sub>, PM<sub>2.5</sub>, and those based on annual averages or arithmetic mean) are not to be exceeded more than once per year. The NAAQS for ozone, PM<sub>10</sub>, and PM<sub>2.5</sub> are based on statistical calculations over 1- to 3-year periods, depending on the pollutant. The SFBAAB is currently designated as a marginal nonattainment area with respect to the national standard for ozone, a nonattainment area for the 24-hour PM<sub>2.5</sub> standard, and ~~is designated as~~ attainment or unclassified area for all other pollutants. Additional details regarding the national attainment status are provided in Table 3.14-3. The NAAQS along with health effects, atmospheric effects, and common source types are shown in Table 3.14-1. .

**FINAL**  
**AIR QUALITY ANALYSIS**

**YERBA BUENA ISLAND RAMPS IMPROVEMENT PROJECT**

**SF-80 PM 7.6/8.1**

**EA 04-3A640K**

***Prepared for:***

San Francisco County Transportation Authority  
100 Van Ness Avenue, 26<sup>th</sup> Floor  
San Francisco, California 94102

and

California Department of Transportation, District 4  
111 Grand Avenue  
Oakland, California 94612

As agent for FHWA as Federal Lead Agency  
pursuant to the National Environmental Policy Act of 1969

***Prepared by:***

AECOM Design and Planning  
150 Chestnut Street  
San Francisco, California 94111  
(415) 955-2800

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## TABLE OF CONTENTS

<u>Chapter</u>	<u>Page</u>
CHAPTER 1.0 – INTRODUCTION .....	1
1.1 Introduction.....	1
1.2 Summary .....	4
1.3 Project Description.....	5
CHAPTER 2.0 – REGULATORY SETTING.....	9
2.1 Regional setting .....	10
CHAPTER 3.0 – AFFECTED ENVIRONMENT.....	13
3.1 Topography, Meteorology, and Climate.....	13
3.2 Existing Sensitive Receptors.....	14
3.3 Existing Air Quality — Criteria Air Pollutants .....	14
3.4 Attainment Status.....	20
3.5 Existing Air Quality — Toxic Air Contaminants .....	23
CHAPTER 4.0 – ENVIRONMENTAL CONSEQUENCES .....	27
4.1 Project Impact Analysis .....	27
4.2 Comparison of Air Quality Impacts Between Alternatives .....	45
4.3 Cumulative Impacts .....	47
CHAPTER 5.0 – POLLUTION ABATEMENT MEASURES .....	49
CHAPTER 6.0 – REFERENCES .....	51
Personal Communications .....	53

## LIST OF EXHIBITS

<u>Exhibits</u>	<u>Page</u>
1 Regional Map.....	2
2 Project Vicinity Map.....	3

## LIST OF TABLES

<u>Tables</u>	<u>Page</u>
1 Summary of Annual Ambient Air Quality Data .....	19
2 San Francisco Bay Area Air Basin California and Federal Attainment Status.....	21
3 National and California Ambient Air Quality Standards.....	22
4 Comparison of Ramp Conditions .....	31

## ACRONYMS AND ABBREVIATIONS

°F	Fahrenheit
µg/m <sup>3</sup>	micrograms per cubic meter
AADT	annual average daily trips
ACM	asbestos containing material
ADT	Average daily trips
ARB	California Air Resources Board
BAAQMD	Bay Area Air Quality Management District
CAA	Clean Air Act
CAAQS	California Ambient Air Quality Standard
Caltrans	California Department of Transportation
CAP	Clean Air Plan
CCAA	California Clean Air Act of 1988
CDC	California Department of Conservation
CFR	Code of Federal Regulations
CO	carbon monoxide
diesel PM	diesel-fueled engines
EPA	U.S. Environmental Protection Agency
ESA	environmental site assessments
FHWA	Federal Highway Administration
FHWA Interim Guidance	Federal Highway Administration's <i>Interim Guidance on Air Toxic Analysis for NEPA Documents</i>
ft.	feet
FTA	Federal Transit Administration
HAP	hazardous air pollutant
HEI	Health Effects Institute
HOV	high occupancy vehicle
I-80	Interstate 80
IRIS	Integrated Risk Information System
LOS	Level of Service
MEI	maximally exposed individual
MSAT	Mobile Source Air Toxic
MTC	Metropolitan Transportation Commission
NAAQS	National Ambient Air Quality Standards
NATA	National Air Toxics Assessment
NEPA	National Environmental Protection Act
NESHAP	National Emissions Standards for Hazardous Air Pollutants



NLEV	national low emission vehicle
NO	nitric oxide
NO <sub>2</sub>	nitrogen dioxide
NOA	naturally occurring asbestos
NOAA	National Oceanic and Atmospheric Administration
NO <sub>x</sub>	oxides of nitrogen
OEHAA	Office of Environmental Health Hazard Assessment
ozone	photochemical smog
PAH	polycyclic aromatic hydrocarbons
PM	particulate matter
PM <sub>10</sub>	particulate matter with aerodynamic diameter less than 10 microns
PM <sub>2.5</sub>	particulate matter with aerodynamic diameter less than 2.5 microns
POAQC	projects of air quality concern
ppm	parts per million
proposed project	Yerba Buena Island Ramp Improvement Project
Protocol	<i>Transportation Project-Level Carbon Monoxide Protocol</i>
RFG	reformulated gasoline
RTIP	Regional Transportation Improvement Plan
RTP	Regional Transportation Plan
SFBAAB	San Francisco Bay Area Air Basin
SFCTA	San Francisco County Transportation Authority
SFOBB	San Francisco-Oakland Bay Bridge
SIP	State Implementation Plan
SO <sub>2</sub>	sulfur dioxide
TAC	toxic air contaminant
TI	Treasure Island
TIP	Transportation Improvement Program
UCD ITS	University of California, Davis Institute of Transportation Studies
USCG	U.S. Coast Guard
USDOT	U.S. Department of Transportation
USEPA	U.S. Environmental Protection Agency
VMT	vehicle miles traveled
VOC	volatile organic gases
YBI	Yerba Buena Island

## CHAPTER 1.0 – INTRODUCTION

### 1.1 INTRODUCTION

The San Francisco County Transportation Authority (SFCTA) proposes to replace the existing westbound on- and off-ramps located east of the Yerba Buena Island (YBI) tunnel with new westbound on- and off-ramps. The project, referred to as the Yerba Buena Island Ramp Improvement Project (proposed project), is located in San Francisco County (the County), approximately halfway between the City of San Francisco and the City of Oakland along the San Francisco-Oakland Bay Bridge (SFOBB). Exhibit 1 shows the location of the project on a regional map, and Exhibit 2 provides a vicinity map for the project site.

The primary purpose of the proposed project is to improve the safety of the existing westbound on- and off-ramps. The existing ramps do not meet current California Department of Transportation (Caltrans) design standards. The new ramps would address the current geometric deficiencies of the existing ramps, provide standard deceleration distance for the off-ramp, and improve acceleration/merging distance for the on-ramp. Overall, implementation of the proposed project would improve traffic operations to and from YBI.

This analysis also provides a description of the regulatory framework for air quality management on federal, state, and regional levels. In addition, this analysis will evaluate the types (e.g., criteria air pollutants, toxic air contaminants [TACs]) and relative quantities of air pollutant emissions that would be generated during short-term construction activities associated with the ramp improvements and the change in long-term operational emissions following completion of the proposed project. The following analysis of air quality impacts is based on air quality regulations administered by the U.S. Environmental Protection Agency (USEPA), Federal Highway Administration (FHWA), Caltrans, the California Air Resources Board (ARB), and the Bay Area Air Quality Management District (BAAQMD).







Source: Prepared by EDAW 2009

## Exhibit 2. Project Vicinity Map

## 1.2 SUMMARY

The proposed project is included in the Transportation 2035 Plan (2035 RTP [Regional Transportation Plan]) as Reference Number 230555 (Reconstruct ramps on east side of the San Francisco-Oakland Bay Bridge's Yerba Buena Island Tunnel) (MTC 2008a). The FHWA and Federal Transit Administration (FTA) adopted the air quality conformity finding for the 2035 RTP on May 29, 2009. The project is also included in Metropolitan Transportation Commission (MTC) financially constrained 2009 Transportation Improvement Program (2009 TIP) on page 38 as TIP ID SF-070027 – Yerba Buena Island Ramp Improvements (MTC 2008b). The design concept and scope of the proposed project are consistent with the project description in the 2035 RTP, the 2009 TIP, and the assumptions in MTC's regional emissions analysis. Therefore, the project would satisfy the regional conformity requirements and is assumed to conform to the State Implementation Plan (SIP). Thus, no adverse regional air quality impact would occur as a result of the project.

This is a new project in an area designated as nonattainment/maintenance for transportation-related criteria air pollutants and therefore, a new project-level conformity determination is required. Analysis of local carbon monoxide (CO) and particulate matter (PM) impacts is required to demonstrate conformity at a project level. The San Francisco Bay Area Air Basin (SFBAAB) is currently a CO maintenance area and therefore federal projects located within the SFBAAB require a local CO impact analysis. Analysis of CO impacts in accordance with the *Transportation Project-Level Carbon Monoxide Protocol* (Protocol) (UCD ITS 1997) shows that the project is satisfactory with respect to local CO impacts and would not cause a violation of the state or federal CO ambient air quality standards. The SFBAAB is designated as an attainment area for particulate matter with aerodynamic diameter less than 10 microns (PM<sub>10</sub>). In December 2008, the SFBAAB was designated as a nonattainment area for the new 35 micrograms per cubic meter (µg/m<sup>3</sup>) 24-hour particulate matter with aerodynamic diameter less than 2.5 microns (PM<sub>2.5</sub>) standard, which replaced the previous 65 µg/m<sup>3</sup> 24-hour standard in September 2006. Prior to the December 2008 designation, the SFBAAB was designated as a PM<sub>2.5</sub> attainment area for the 65 µg/m<sup>3</sup> 24-hour PM<sub>2.5</sub> standard. On October 9, 2009, USEPA published a final ruling that designated the SFBAAB as nonattainment for the 2006 24-hour PM<sub>2.5</sub> standard. In accordance with the new nonattainment status, an analysis of the proposed project's localized PM impacts was also conducted. According to USEPA's *Transportation Conformity Guidance for Qualitative Hot Spot Analyses in PM<sub>2.5</sub> and PM<sub>10</sub> Nonattainment and Maintenance Areas* (PM Guidance), PM impacts from transportation projects are of concern only for projects defined as "projects of air quality concern" (POAQC) (FHWA 2006a). Analysis of proposed project pursuant to the PM Guidance determined that the project is not a POAQC.



The proposed project was evaluated for potential Mobile Source Air Toxics (MSATs) air quality impacts in accordance with the FHWA's *Interim Guidance on Air Toxic Analysis for NEPA Documents* (FHWA Interim Guidance) (FHWA 2006b) and *Interim Guidance Update on Mobile Source Air Toxic Analysis in NEPA Documents* (MSAT Interim Guidance Update) (FHWA 2009a) and was found to not result in any adverse MSAT impacts.

In addition, a discussion of construction emissions, potential impacts, and measures to avoid or minimize the impacts is included in this analysis. These emissions would be temporary and would cease at the completion of construction activities.

### **1.3 PROJECT DESCRIPTION**

The proposed project is located in the County along the SFOBB. YBI is only accessible to vehicular traffic via the SFOBB stretch of Interstate 80 (I-80). The SFOBB is considered a "lifeline structure" and is a critical link between the East Bay and San Francisco. It provides the only vehicle access to YBI, the active U.S. Coast Guard (USCG) facilities located on the south side of the island, and Treasure Island (TI), located immediately north of YBI.

The current ramps do not meet current Caltrans design standards. The proposed project would remove the existing ramps and construct new ramps that maintain the functional role of the current ramps while satisfying seismic requirements, highway design standards, traffic operations, and improving safety. The new ramps would also provide standard deceleration distance for the off-ramp and improved acceleration/merging distance for the on-ramp. The proposed project is independent of both the SFOBB East Span Seismic Safety Project, currently under construction, and the Treasure Island and Yerba Buena Island (TI/YBI) Redevelopment Plan, currently undergoing its own environmental review process.

The proposed project is located between post-mile 7.6 and 8.1 beginning at the east portal of the YBI tunnel and ending at the east side of the Transition Structure portion of the new SFOBB. The SFOBB Transition Structure is located between post mile 7.9 and 8.1 between the YBI tunnel and the SFOBB Self-Anchored Suspension span.

Alternatives have been proposed to address the geometric deficiencies of the existing on- and off-ramps. The three following alternatives are currently under consideration:

- **No Build Alternative**

This Alternative assumes that the existing on- and off-ramps would remain in place and no further action or improvements would occur.



- **Alternative 2b**

Alternative 2b would include removal of the existing westbound on- and off-ramps on the east side of YBI, construction of a westbound loop on-ramp from Macalla Road on the east side of YBI, and construction of a westbound off-ramp to Macalla Road on the east side of YBI.

This alternative proposes to reconstruct two of the existing six on- and off-ramps at the I-80/YBI interchange. The proposed on- and off-ramps would provide standard shoulder widths, and would include the following features:

- Westbound on-ramp on the east side of YBI — This ramp would begin at the “T” intersection at Macalla Road, loop right with a tight radius, and merge on to the north side of the SFOBB. The length of this ramp would be approximately 876 feet. This ramp would have two traffic lanes merging into one as it connects to the SFOBB. One lane would be a high occupancy vehicle (HOV) lane and the other a mixed-flow lane.
- Westbound off-ramp on the on the east side of YBI — This ramp would diverge from the new SFOBB Transition Structure between bents W3 and W4 curving around the Nimitz House and terminate at the “T” intersection at Macalla Road. The length of this ramp would be approximately 1,115 feet. A stop sign is proposed at the ramp terminus.
- Macalla Road would be widened for approximately 660 feet adjacent to the terminus of the westbound on- and off-ramps. The existing roadway is about 20 feet wide near the ramp terminus. The roadway widening is required to accommodate a 12-foot-wide multi-use pedestrian/bike path and two 12-foot-wide lanes within the Caltrans right-of-way. A retaining wall would be constructed adjacent to Macalla Road to provide the required width. The height of the retaining wall would vary from 4 to 16 feet and would retain the hillside above Macalla Road. The stairway adjacent to the Caltrans Substation would be relocated to the west side of the building to make room for the new retaining wall. The roadway width would vary around the curve at South Gate Road to provide proper width for truck turning movements.
- Under Alternative 2b, the westbound on- and off-ramps would terminate at Macalla Road where Quarters 10 and Building 267 are currently located. Quarters 10 and Building 267 would be relocated prior to construction of the ramps at Macalla Road. The relocation site for these buildings would be on YBI and would be determined under the Section 106 mitigation development process.

- **Alternative 4**

Alternative 4 would include the removal of the existing westbound on- and off-ramps on the east side of the YBI, construction of a westbound on-ramp from South Gate Road, and construction of a westbound off-ramp to Macalla Road on the east side of YBI.

This alternative proposes to reconstruct two of the existing six on- and off-ramps at the I-80/YBI interchange. The proposed on- and off-ramps would provide standard shoulder widths, and would include the following features:

- Westbound on-ramp on the east side of YBI — This ramp would begin at South Gate Road, proceed east paralleling the eastbound on-ramp, loop under the new SFOBB Transition Structure near its eastern end to provide adequate merging distances, cross over the westbound off-ramp along the north side of the SFOBB. The length of this ramp would be approximately 2,883 feet. A HOV lane would not be provided under Alternative 4.
- Westbound off-ramp on the east side of YBI — This ramp would diverge from the new SFOBB Transition Structure between bents W2 and W3, parallel the Transition Structure, cross under the westbound on-ramp and terminate at the “T” intersection at Macalla Road. The length of this ramp would be approximately 1,168. A stop sign is proposed at the ramp terminus.
- Macalla Road would be widened for approximately 660 feet adjacent to the terminus of the westbound on- and off-ramps. The existing roadway is about 20 feet wide near the ramp terminus. The roadway widening is required to accommodate a 12-foot-wide multi-use pedestrian/bike path and two 12-foot-wide lanes within the Caltrans right-of-way. A retaining wall would be constructed adjacent to Macalla Road to provide the required width. The height of the retaining wall would vary from 4 to 16 feet and would retain the hillside above Macalla Road. The roadway width would vary around the curve at South Gate Road to provide proper width for truck turning movements.
- Under Alternative 4, Quarters 10 and Building 267 and its associated landscaping would remain in place.

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## CHAPTER 2.0 – REGULATORY SETTING

The Clean Air Act (CAA) as amended in 1990 is the federal law that governs air quality. Its counterpart in California is the California Clean Air Act of 1988 (CCAA). These laws set standards for the quantity of pollutants that can be in the air. At the federal level, these standards are called National Ambient Air Quality Standards (NAAQS). NAAQS have been established for six criteria air pollutants that have been linked to potential health concerns; the criteria air pollutants are CO, nitrogen dioxide (NO<sub>2</sub>), ozone, PM (which PM<sub>10</sub> and PM<sub>2.5</sub> are a subset of), lead, and sulfur dioxide (SO<sub>2</sub>).

Under the 1990 CAA Amendments, the U.S. Department of Transportation (USDOT) cannot fund, authorize, or approve federal actions to support programs or projects that are not first found to conform to the SIP for achieving the goals of the CAA requirements. The specific requirements for determining conformity for transportation projects are included in the USEPA's Transportation Conformity Rule. Transportation conformity with the CAA takes place on two levels—first, at the regional level and second, at the project level. The proposed project must conform at both levels to be approved.

Regional level conformity within California is focused on the standards set for CO, NO<sub>2</sub>, ozone, and PM, as California is in attainment for the other criteria air pollutants. At the regional level, RTPs are developed that include all of the transportation projects planned for a region over a period of years, usually at least 20. Based on the projects included in the RTP, air quality modeling is conducted to determine whether the implementation of those projects would conform to emission budgets or other tests showing that the projects in the RTP would not obstruct or conflict with the SIP regarding the timely attainment of the NAAQS. If conformity with the SIP is demonstrated, the regional planning organization, such as MTC for the SFBAAB and the appropriate federal agencies, such as the USDOT, make determinations that the RTP is in conformity with the SIP for achieving the goals of the CAA. Otherwise, the projects in the RTP must be modified until conformity is attained. If the design and scope of the proposed transportation project are the same as those described in the RTP, then the proposed project is deemed to meet regional conformity requirements.

Conformity at the project-level requires a “hot spot” (i.e., exceedance of NAAQS or California Ambient Air Quality Standard [CAAQS]) analysis if an area is a “nonattainment” or “maintenance” area for CO and/or PM. A region is a “nonattainment” area if one or more monitoring stations in the region fail to attain the relevant standard. Areas that were previously designated as nonattainment areas, but have recently met the standard are called “maintenance” areas. A “hot spot” analysis is essentially the same, for technical purposes, as a CO or PM analysis performed for National Environmental Protection Act (NEPA) purposes. Conformity

does include some specific standards for projects that require a “hot spot” analysis. In general, projects must not cause the CO standard to be violated, and in “nonattainment” areas the project must not cause any increase in the number and severity of violations. If a known CO or PM violation is located in the project vicinity, the project must include measures to reduce or eliminate the existing violation(s) as well. The SFBAAB is a CO “maintenance” area; therefore, the proposed project is subject to a CO “hot spot” analysis. As discussed above, the SFBAAB was previously designated as attainment for the PM<sub>2.5</sub> standard; however, in December 2008, it was designated as nonattainment for the new PM<sub>2.5</sub> 24-hour standard (i.e., 35 µg/m<sup>3</sup>). On October 9, 2009, USEPA published a final ruling that designated the SFBAAB as nonattainment for the 2006 24-hour PM<sub>2.5</sub> standard. The ruling will become effective 30 days after publication in the Federal Register; however, in anticipation of the new nonattainment status, a PM “hot spot” analysis was performed for the proposed project.

## **2.1 REGIONAL SETTING**

Management of air quality in the basin is the responsibility of the BAAQMD. The BAAQMD is responsible for bringing and/or maintaining air quality in the basin within federal and state air quality standards. Specifically, the BAAQMD has responsibility for monitoring ambient air pollutant levels throughout the basin and developing and implementing attainment strategies to ensure that future emissions will be within federal and state standards. The following plans have been developed by the BAAQMD to achieve attainment of the federal and state ozone standards. The Clean Air Plan (CAP) and Ozone Strategy fulfill the planning requirements of the CCAA, while the Ozone Attainment Plan fulfills the federal CAA requirements. In addition, in December of 1999, the BAAQMD released a revision to the previously adopted CEQA guidelines document. The BAAQMD is currently in the process of updating its CEQA guidelines and recommended significance thresholds. The new guidelines would involve developing quantitative CEQA significance thresholds for construction-related emissions of criteria air pollutants, precursors, TACs, and GHG (BAAQMD 2009). The BAAQMD expects to adopt these new thresholds of significance in late 2009.

### **Bay Area Air Quality Management District Rules and Regulations**

The BAAQMD is primarily responsible for limiting the amount of emissions that can be generated throughout the basin by stationary sources. Specific rules and regulations have been adopted that limit emissions that can be generated by various uses and/or activities and identify specific pollution reduction measures that must be implemented in association with various uses and activities. These rules regulate not only the emissions of the state and federal criteria air pollutants, but also the emissions of TACs. The rules are also subject to ongoing refinement by the BAAQMD. The following rules and regulations would apply to the proposed project:

- Regulation 7: Odorous Substances;
- Regulation 8, Rule 3: Architectural Coatings; and
- Regulation 8, Rule 15: Emulsified Asphalt.



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## **CHAPTER 3.0 – AFFECTED ENVIRONMENT**

The proposed project is located along the SFOBB, approximately 2.3 miles northeast of the City of San Francisco. The project site is located in the County, which is part of the SFBAAB. The SFBAAB includes all of Alameda, Contra Costa, Marin, Napa, San Francisco, San Mateo, and Santa Clara counties as well as the southern half of Sonoma County and the southwestern portion of Solano County. Air quality within the SFBAAB is regulated by USEPA, ARB, and BAAQMD. The following analysis describes the existing air quality conditions on a regional and local level that influence air quality.

### **3.1 TOPOGRAPHY, METEOROLOGY, AND CLIMATE**

The SFBAAB is characterized by complex terrain, consisting of coastal mountain ranges, inland valleys, and bays, which distort normal wind flow patterns. Air quality within the SFBAAB is influenced by two main mountain ranges. The Diablo Range forms the eastern and southern border while the Coast Range forms the western border. The gaps and directional orientation of these mountain ranges affect the location of where air flow enters and exits the SFBAAB. In the northern portion of the SFBAAB, the Coast Range splits, resulting in the western (Golden Gate) coast gap and the eastern (Carquinez Strait) coast gap. These gaps allow air to flow in and out of the SFBAAB. The Golden Gate coast gap allows marine air during afternoons and evenings to flow into the SFBAAB, which disperses and transports air pollution to neighboring counties and air basins. Winds coming from the Pacific Ocean through the Golden Gate coast gap have typical speeds of 20–30 miles per hour (NOAA 1995). Air flows into Solano County through the Carquinez Strait, moving across the Sacramento–San Joaquin River Delta, and transporting pollution from the Bay Area. In the areas south of the Carquinez Strait, the Coast Range, which has an average elevation of 3,000 feet, impedes pollutants from dispersing to the east.

Localized meteorological conditions, such as moderate winds, disperse pollutants and reduce pollutant concentrations. An inversion layer develops when a layer of warm air traps cooler air close to the ground. Such temperature inversions hamper dispersion by creating a ceiling over the area and trapping air pollutants near the ground. During summer mornings and afternoons, these inversions are present in the northeast areas of the SFBAAB. During summer's longer daylight hours, plentiful sunshine provides the energy needed to fuel photochemical reactions between volatile organic gases (VOC) and oxides of nitrogen (NO<sub>x</sub>), which result in ozone formation.

Local meteorology of the project area is represented by measurements recorded at the San Francisco Bay Area station. The region receives an average of 21.5 inches of precipitation per year, which primarily occurs from the months of October through April (NOAA 1995). Off-

season rains (May through September) account for approximately 5 percent of the annual average rainfall. Maximum summer temperatures range from 60 to 70 degrees Fahrenheit (°F). Minimum wintertime temperatures range from 45 to 50°F (NOAA 1995).

Climate within the SFBAAB is largely controlled by the presence of the Pacific High Pressure Cell, which is located in the northern Pacific Ocean off the coast of California. During the summertime, the High Pressure Cell deflects incoming storms from traveling inland. As a result, the SFBAAB receives little precipitation during these months, as described above. Beginning in the fall and continuing through the winter, the High Pressure Cell weakens and resides off the coast of Southern California. The absence of the High Pressure Cell allows storms to travel inland and reach many portions of the SFBAAB. Temperature, winds, and rainfall become more variable during the winter months with the frequent presence of dense fog. Winter weather patterns include periods of stormy weather with rain and gusty winds.

### **3.2 EXISTING SENSITIVE RECEPTORS**

Sensitive land uses are facilities that generally house people that may experience adverse effects from unhealthful concentrations of air pollutants (i.e., sensitive receptors). Commonly identified sensitive land uses are residences, schools, playgrounds, childcare centers, retirement homes or convalescent homes, hospitals, and clinics. Sensitive receptors in the project area include three residential units south of the project site (approximately 650 feet). Commercial buildings are situated to the west and southeast of the project site; however, these uses are not considered sensitive receptors.

### **3.3 EXISTING AIR QUALITY — CRITERIA AIR POLLUTANTS**

Criteria air pollutants can cause health risks to the public when their concentrations reach certain levels. As discussed above, the meteorology, topography, and climate of a region can influence the concentration and dispersion of air pollutants in the atmosphere. A brief description of each criteria air pollutant including source types, health effects, and future trends is provided below along with the current attainment area designations and monitoring data for the project study area.

#### **Ozone**

Ozone is a photochemical oxidant, a substance whose oxygen combines chemically with another substance in the presence of sunlight, and the primary component of smog. Ozone is not directly emitted into the air, but is formed through complex chemical reactions between precursor emissions of VOC and NO<sub>x</sub> in the presence of sunlight. VOC emissions result primarily from incomplete combustion and the evaporation of chemical solvents and fuels. NO<sub>x</sub> are a group of gaseous compounds of nitrogen and oxygen that results from the combustion of fuels.



Ozone located in the upper atmosphere (stratosphere) acts in a beneficial manner by shielding the earth from harmful ultraviolet radiation that is emitted by the sun. However, ozone located in the lower atmosphere (troposphere) is a major health and environmental concern. Meteorology and terrain play a major role in ozone formation. Generally, low wind speeds or stagnant air coupled with warm temperatures and clear skies provide the optimum conditions for formation. As a result, summer is generally the peak ozone season. Because of the reaction time involved, peak ozone concentrations often occur far downwind of the precursor emissions. Therefore, ozone is a regional pollutant that often affects large areas. In general, ozone concentrations over or near urban and rural areas reflect an interplay of emissions of ozone precursors, transport, meteorology, and atmospheric chemistry (Godish 2004).

The adverse health effects associated with exposure to ozone pertain primarily to the respiratory system. Scientific evidence indicates that ambient levels of ozone affect not only sensitive receptors, such as asthmatics and children, but healthy adults as well. Exposure to ambient levels of ozone ranging from 0.10 to 0.40 parts per million (ppm) for 1 or 2 hours has been found to significantly alter lung function by increasing respiratory rates and pulmonary resistance, decreasing tidal volumes, and impairing respiratory mechanics. Ambient levels of ozone above 0.12 ppm are linked to symptomatic responses that include such symptoms as throat dryness, chest tightness, headache, and nausea. In addition to the above adverse health effects, evidence also exists relating ozone exposure to an increase in the permeability of respiratory epithelia; such increased permeability leads to an increase in responsiveness of the respiratory system to challenges, and the interference or inhibition of the immune system's ability to defend against infection (Godish 2004).

Emissions of ozone precursors VOC and NO<sub>x</sub> have decreased over the past several years as a result of more stringent motor vehicle standards and cleaner burning fuels. Consequently, peak 1-hour and 8-hour ozone concentrations in the SFBAAB have declined overall by about 18 percent during the last 20 years. Peak 1-hour and 8-hour ozone concentrations in the SFBAAB have declined approximately 17 percent and 18 percent, respectively, in the past 20 years (1988 to 2007) (ARB 2009a). However, it is not clear if this reduction represents a significant change in the overall trend due to the variability caused by meteorological conditions in the SFBAAB (ARB 2009a).

### **Carbon Monoxide**

CO is a colorless, odorless gas that is formed when carbon in fuel is not burned completely. It is a component of motor vehicle exhaust, which contributes about 56 percent of all CO emissions nationwide. Other non-road engines and vehicles (such as construction equipment and boats) contribute about 22 percent of all CO emissions nationwide. Higher levels of CO generally occur in areas with heavy traffic congestion. In cities, 85–95 percent of all CO emissions may come

from motor vehicle exhaust. Other sources of CO emissions include industrial processes (such as metals processing and chemical manufacturing), residential wood burning, and natural sources such as forest fires. Woodstoves, gas stoves, cigarette smoke, and unvented gas and kerosene space heaters are sources of CO indoors. The highest levels of CO in the outside air typically occur during the colder months of the year when inversion conditions are more frequent. The air pollution becomes trapped near the ground beneath a layer of warm air (USEPA 2009a).

CO enters the bloodstream through the lungs by combining with hemoglobin, which normally supplies oxygen to the cells. However, CO combines with hemoglobin much more readily than oxygen does, resulting in a drastic reduction in the amount of oxygen available to the cells. Adverse health effects associated with exposure to CO concentrations include such symptoms as dizziness, headaches, and fatigue. CO exposure is especially harmful to individuals who suffer from cardiovascular and respiratory diseases (USEPA 2009a).

The highest concentrations are generally associated with cold, stagnant weather conditions that occur during the winter. In contrast to problems caused by ozone, which tends to be a regional pollutant, CO problems tend to be localized.

### **Nitrogen Dioxide**

NO<sub>2</sub> is a brownish, highly reactive gas that is present in all urban environments. The major human-made sources of NO<sub>2</sub> are combustion devices, such as boilers, gas turbines, and mobile, and stationary reciprocating internal-combustion engines. Combustion devices emit primarily nitric oxide (NO), which reacts through oxidation in the atmosphere to form NO<sub>2</sub> (USEPA 2009a). The combined emissions of NO and NO<sub>2</sub> are referred to as NO<sub>x</sub>, which are reported as equivalent NO<sub>2</sub>. Because NO<sub>2</sub> is formed and depleted by reactions associated with photochemical smog (ozone), the NO<sub>2</sub> concentration in a particular geographical area may not be representative of the local NO<sub>x</sub> emission sources.

Inhalation is the most common route of exposure to NO<sub>2</sub>. Because NO<sub>2</sub> has relatively low solubility in water, the principal site of toxicity is in the lower respiratory tract. The severity of the adverse health effects depends primarily on the concentration inhaled rather than the duration of exposure. An individual may experience a variety of acute symptoms, including coughing, difficulty with breathing, vomiting, headache, and eye irritation, during or shortly after exposure. After a period of approximately 4–12 hours, an exposed individual may experience chemical pneumonitis or pulmonary edema with breathing abnormalities, cough, cyanosis, chest pain, and rapid heartbeat. Severe, symptomatic NO<sub>2</sub> intoxication after acute exposure has been linked on occasion with prolonged respiratory impairment, with such symptoms as chronic bronchitis and decreased lung functions (USEPA 2009a).



## **Sulfur Dioxide**

SO<sub>2</sub> is produced by such stationary sources as coal and oil combustion, steel mills, refineries, and pulp and paper mills. The major adverse health effects associated with SO<sub>2</sub> exposure pertain to the upper respiratory tract. SO<sub>2</sub> is a respiratory irritant with constriction of the bronchioles occurring with inhalation of SO<sub>2</sub> at five ppm or more. On contact with the moist mucous membranes, SO<sub>2</sub> produces sulfurous acid, which is a direct irritant. Concentration rather than duration of the exposure is an important determinant of respiratory effects. Exposure to high SO<sub>2</sub> concentrations may result in edema of the lungs or glottis and respiratory paralysis.

## **Particulate Matter**

Respirable particulate matter with an aerodynamic diameter of 10 micrometers or less is referred to as PM<sub>10</sub>. PM<sub>10</sub> consists of particulate matter emitted directly into the air, such as fugitive dust, soot, and smoke from mobile and stationary sources; construction operations, fires, and natural windblown dust, and particulate matter formed in the atmosphere by condensation and/or transformation of SO<sub>2</sub> and VOC (USEPA 2009a). PM<sub>2.5</sub> is another classification of particulate matter that has been evaluated as a pollutant due to the increased health risks associated with these smaller particulates that can reach deeper into the lungs (ARB 2009a).

The adverse health effects associated with PM<sub>10</sub> depend on the specific composition of the particulate matter. For example, health effects may be associated with metals, polycyclic aromatic hydrocarbons (PAH), and other toxic substances adsorbed onto fine particulate matter (which is referred to as the “piggybacking effect”), or with fine dust particles of silica or asbestos. Generally, adverse health effects associated with PM<sub>10</sub> may result from both short-term and long-term exposure to elevated concentrations and may include breathing and respiratory symptoms, aggravation of existing respiratory and cardiovascular diseases, alterations to the immune system, carcinogenesis, and premature death (USEPA 2009a). PM<sub>2.5</sub> poses an increased health risk because the particles can deposit deep in the lungs and contain substances that are particularly harmful to human health.

Direct emissions of both PM<sub>10</sub> and PM<sub>2.5</sub> increased slightly in the SFBAAB between 1975 and 2005 and are projected to increase through 2020. These emissions are dominated by areawide sources, primarily because of development. Direct emissions of PM from mobile and stationary sources have remained relatively steady (ARB 2009a).

## **Lead**

Lead is a metal found naturally in the environment as well as in manufactured products. The major sources of lead emissions have historically been mobile and industrial sources. As a result



of the phase-out of leaded gasoline, as discussed in detail below, metal processing is currently the primary source of lead emissions. The highest levels of lead in air are generally found near lead smelters. Other stationary sources are waste incinerators, utilities, and lead-acid battery manufacturers.

Twenty years ago, mobile sources were the main contributor to ambient lead concentrations in the air. In the early 1970s, USEPA set national regulations to gradually reduce the lead content in gasoline. In 1975, unleaded gasoline was introduced for motor vehicles equipped with catalytic converters. USEPA banned the use of leaded gasoline in highway vehicles in December 1995 (USEPA 2009a).

As a result of USEPA's regulatory efforts to remove lead from gasoline, emissions of lead from the transportation sector have declined dramatically (95 percent between 1980 and 1999), and levels of lead in the air decreased by 94 percent between 1980 and 1999. Transportation sources, primarily airplanes, now contribute only 13 percent of lead emissions. A recent National Health and Nutrition Examination Survey reported a 78-percent decrease in the levels of lead in people's blood between 1976 and 1991. This dramatic decline can be attributed to the move from leaded to unleaded gasoline (USEPA 2009a).

Lead emissions and ambient lead concentrations have decreased dramatically in California over the past 25 years. The rapid decrease in lead concentrations can be attributed primarily to phasing out the lead in gasoline. This phase-out began during the 1970s, and subsequent ARB regulations have eliminated virtually all lead from gasoline now sold in California. All areas of the state are currently designated as attainment for the state lead standard (USEPA does not designate areas for the national lead standard). Although the ambient lead standards are no longer violated, lead emissions from stationary sources still pose "hot spot" problems in some areas. As a result, ARB has identified lead as a TAC.

### **Monitoring Station Data**

To identify ambient concentrations of criteria air pollutants, the BAAQMD and ARB operate more than 30 air quality monitoring stations throughout the SFBAAB. The nearest monitoring station to the project site is located at 10 Arkansas Street in San Francisco, approximately four miles southwest of the project site. This monitoring station measures ozone, NO<sub>2</sub>, CO, SO<sub>2</sub>, PM<sub>10</sub>, and PM<sub>2.5</sub>. In general, the ambient air-quality measurements from this station are representative of the air quality in the project area. Table 1 summarizes the air quality data from the most recent 3 years (2006–2008).

Table 1 lists the concentrations registered and the exceedances of CAAQS and the NAAQS that have occurred at this monitoring station from 2006 through 2008. During this period, the station

did not register any days above the state 1-hour or 8-hour ozone standards. The state CO and NO<sub>2</sub> standards were also not exceeded at the monitoring station in the last 3 years. The 24-hour PM<sub>10</sub> CAAQS was exceeded on multiple days in 2006 and 2007, but not in 2008. The 24-hour PM<sub>2.5</sub> NAAQS was also exceeded during 2006 and 2007, but not in 2008.

**Table 1. Summary of Annual Ambient Air Quality Data <sup>1</sup>**

	2006	2007	2008
<b>OZONE</b>			
Maximum concentration (1-hour/8-hour, ppm)	0.053/0.046	0.060/0.053	0.082/0.066
Number of days state standard exceeded (1-hour/8-hour)	0/0	0/0	0/0
Number of days national standard exceeded (8-hour) <sup>2</sup>	0	0	0
<b>Carbon Monoxide (CO)</b>			
Maximum concentration (1-hour/8-hour, ppm)	2.7/2.09	2.5/1.60	2.1/2.29
Number of days state standard exceeded (8-hour)	0	0	0
Number of days national standard exceeded (1-hour/8-hour)	0/0	0/0	0/0
<b>Nitrogen Dioxide (NO<sub>2</sub>)</b>			
Maximum concentration (1-hour, ppm)	0.107	0.069	0.062
Number of days state standard exceeded	0	0	0
Annual average (ppm)	0.016	0.016	0.016
<b>Sulfur Dioxide (SO<sub>2</sub>)</b>			
Maximum concentration (24-hour, ppm)	0.007	0.006	0.004
Number of days state standard exceeded	0	0	0
Number of days national standard exceeded	0	0	0
<b>Fine Particulate Matter (PM<sub>2.5</sub>)</b>			
Maximum concentration (µg/m <sup>3</sup> ) (National/California <sup>3</sup> )	54.3/54.3	45.2/45.2	29.4/39.2
Number of days national standard exceeded (measured/estimated <sup>4</sup> ) <sup>5</sup>	3/3.1	5/5.1	0/—
Annual average (µg/m <sup>3</sup> ) (National/California)	9.7/9.7	8.7/8.9	—/11.7
<b>Respirable Particulate Matter (PM<sub>10</sub>)</b>			
Maximum concentration (µg/m <sup>3</sup> ) (National/California <sup>3</sup> )	58.0/61.4	65.7/69.8	41.2/41.3
Number of days state standard exceeded (measured/estimated <sup>4</sup> )	3/17.3	2/12.0	0/0.0
Number of days national standard exceeded (measured/estimated <sup>4</sup> )	0/0.0	0/0.0	0/0.0
Annual average (µg/m <sup>3</sup> ) (National/California)	22.9	21.9	2.00

Notes: µg/m<sup>3</sup> = micrograms per cubic meter; ppm = parts per million; — = data not available

1 Measurements were recorded at the Arkansas Street monitoring station.

2 The 8-hour national ozone standard was revised to 0.075 ppm in March 2008. Statistics shown are based on the previous 0.08 ppm standard.

3 State and national statistics may differ for the following reasons: State statistics are based on California-approved samplers, whereas national statistics are based on samplers using federal reference or equivalent methods. State and national statistics may therefore be based on different samplers. State statistics are based on local conditions while national statistics are based on standard conditions. State criteria for ensuring that data are sufficiently complete for calculating valid annual averages are more stringent than the national criteria.

4 Measured days are those days that an actual measurement was greater than the level of the state daily standard or the national daily standard. Measurements are typically collected every 6 days. Estimated days mathematically estimate the number of days concentrations would have been greater than the level of the standard had each day been monitored. The number of days above the standard is not necessarily the number of violations of the standard for the year.

5 The national PM<sub>2.5</sub> 24-hour standard was revised from 65 µg/m<sup>3</sup> to 35µg/m<sup>3</sup> in September 2006. Statistics shown are based on the 65 µg/m<sup>3</sup> standard.

Sources: ARB 2009b; USEPA 2009b



### 3.4 ATTAINMENT STATUS

Both ARB and USEPA use monitoring data (Table 1) to designate an area's attainment status for criteria air pollutants. The purpose of these designations is to identify areas with air quality problems and thereby initiate planning efforts for improvement. The three basic designation categories are "nonattainment," "attainment," and "unclassified." The "unclassified" designation is used in an area that cannot be classified on the basis of available information as meeting or not meeting the standards. In addition, ARB designations include a subcategory of the nonattainment designation, called "nonattainment-transitional." The nonattainment-transitional designation is given to nonattainment areas that are progressing and nearing attainment. The most recent attainment designations with respect to the SFBAAB are shown in Table 2 for each criteria air pollutant.

The determination of whether a region's air quality is healthful or unhealthful is made by comparing contaminant levels in ambient air samples to national and state standards. Health-based air quality standards have been established by ARB, at the state level, and USEPA, at the national level for the following criteria air pollutants: ozone, CO, NO<sub>2</sub>, SO<sub>2</sub>, PM<sub>10</sub>, PM<sub>2.5</sub>, and lead. These standards were established to protect the public with a margin of safety from adverse health impacts due to exposure to air pollution. California has also established standards for sulfates, visibility-reducing particles, hydrogen sulfide, and vinyl chloride. The state and national ambient air quality standards for each of the monitored pollutants are presented in Table 3. The current attainment designations for the County portion of the SFBAAB are summarized in Table 2 below.

#### **Federal Attainment Status**

The NAAQS (other than for ozone, PM<sub>10</sub>, PM<sub>2.5</sub> and those based on annual averages or arithmetic mean) are not to be exceeded more than once per year. The NAAQS for ozone, PM<sub>10</sub>, and PM<sub>2.5</sub> are based on statistical calculations over 1- to 3-year periods, depending on the pollutant. The SFBAAB is currently designated as a marginal nonattainment area with respect to the national ozone standard, a maintenance area with respect to the national CO standards, and a nonattainment area with respect to the PM<sub>2.5</sub> 24-hour standard. The SFBAAB is designated as attainment or unclassified for all other pollutants. Additional details regarding the national attainment status are provided in Table 2 above. The NAAQS along with health effects, atmospheric effects, and common source types are shown in Table 3.



**Table 2. San Francisco Bay Area Air Basin California and Federal Attainment Status**

Pollutant	Averaging Time	California Attainment Status	Federal Attainment Status
Ozone	1-hour	N	—
	8-hour	N	N
Carbon Monoxide (CO)	1-hour	A	A/M
	8-hour	A	A/M
Nitrogen Dioxide (NO <sub>2</sub> )	Annual Arithmetic Mean	—	U/A
	1-hour	A	—
Sulfur Dioxide (SO <sub>2</sub> )	Annual Arithmetic Mean	—	—
	24-hour	A	A
	3-hour	—	—
	1-hour	A	—
Respirable Particulate Matter (PM <sub>10</sub> )	Annual Arithmetic Mean	N	—
	24-hour	N	U
Fine Particulate Matter (PM <sub>2.5</sub> )	Annual Arithmetic Mean	N	A
	24-hour	—	N <sup>1</sup>
Lead	30-day Average	A	—
	Calendar Quarter	—	A

Notes: N = nonattainment; A = attainment; M = maintenance; U/A = unclassified/attainment; U = unclassified; — = no standard

<sup>1</sup> On October 9, 2009, USEPA published a final ruling in the Federal Register designating the SFBAAB as nonattainment for the 2006 24-hour PM<sub>2.5</sub> standard. The rule will become effective 30 days after publication in the Federal Register.

Sources: ARB 2009c; USEPA 2009c

### **California Attainment Status**

Air quality of a region is considered to be in attainment of the CAAQS if the measured ambient air pollutant levels for ozone, CO, SO<sub>2</sub> (1- and 24-hour), NO<sub>2</sub>, PM<sub>10</sub>, PM<sub>2.5</sub>, and visibility-reducing particles are not exceeded, and all other standards are not equaled or exceeded at any time in any consecutive 3-year period. The SFBAAB is currently designated as a nonattainment area with respect to the state standards for ozone, PM<sub>10</sub>, and PM<sub>2.5</sub> and is designated as attainment or unclassified for all other pollutants. Additional details regarding the state attainment status are provided in Table 2 above. The CAAQS along with health effects, atmospheric effects, and common source types are shown in Table 3.

**Table 3. National and California Ambient Air Quality Standards**

Pollutant	Averaging Time	State Standard	Federal Standard	Health and Atmospheric Effects	Typical Sources
Ozone <sup>a</sup>	1 hour 8 hours	0.09 ppm 0.070 ppm	— <sup>b</sup> 0.075 ppm	High concentrations irritate lungs. Long-term exposure may cause lung tissue damage. Long-term exposure damages plant materials and reduces crop productivity. Precursor organic compounds include a number of known toxic air contaminants.	Low-altitude ozone is almost entirely formed from VOC and NO <sub>x</sub> in the presence of sunlight and heat. Major sources include motor vehicles and other mobile sources, solvent evaporation, and industrial and other combustion processes. Biologically-produced VOC may also contribute.
Carbon Monoxide (CO)	1 hour 8 hours 8 hours (Lake Tahoe)	20 ppm 9.0 ppm <sup>c</sup> 6 ppm	35 ppm 9 ppm —	Asphyxiant. CO interferes with the transfer of oxygen to the blood and deprives sensitive tissues of oxygen.	Combustion sources, especially gasoline-powered engines and motor vehicles. CO is the traditional signature pollutant for on-road mobile sources at the local and neighborhood scale.
Respirable Particulate Matter (PM <sub>10</sub> ) <sup>a</sup>	24 hours Annual	50 µg/m <sup>3</sup> 20 µg/m <sup>3</sup>	150 µg/m <sup>3</sup> —	Irritates eyes and respiratory tract. Decreases lung capacity. Associated with increased cancer and mortality. Contributes to haze and reduced visibility. Includes some toxic air contaminants. Many aerosol and solid compounds are part of PM <sub>10</sub> .	Dust- and fume-producing industrial and agricultural operations; combustion smoke; atmospheric chemical reactions; construction and other dust-producing activities; unpaved road dust and re-entrained paved road dust; natural sources (wind-blown dust, ocean spray).
Fine Particulate Matter (PM <sub>2.5</sub> ) <sup>a</sup>	24 hours Annual	— 12 µg/m <sup>3</sup>	35 µg/m <sup>3</sup> 15 µg/m <sup>3</sup>	Increases respiratory disease, lung damage, cancer, and premature death. Reduces visibility and produces surface soiling. Most diesel exhaust particulate matter – considered a toxic air contaminant – is in the PM <sub>2.5</sub> size range. Many aerosol and solid compounds are part of PM <sub>2.5</sub> .	Combustion including motor vehicles, other mobile sources, and industrial activities; residential and agricultural burning; also formed through atmospheric chemical (including photochemical) reactions involving other pollutants including NO <sub>x</sub> , SO <sub>x</sub> , ammonia, and VOC.
Nitrogen Dioxide (NO <sub>2</sub> )	1 hour Annual	0.18 ppm 0.030 ppm	— 0.053 ppm	Irritating to eyes and respiratory tract. Colors atmosphere reddish-brown. Contributes to acid rain.	Motor vehicles and other mobile sources; refineries; industrial operations.
Sulfur Dioxide (SO <sub>2</sub> )	1 hour 3 hours 24 hours Annual	0.25 ppm — 0.04 ppm —	— 0.5 ppm 0.14 ppm 0.030 ppm	Irritates respiratory tract; injures lung tissue. Can yellow plant leaves. Destructive to marble, iron, steel. Contributes to acid rain. Limits visibility.	Fuel combustion (especially coal and high-sulfur oil), chemical plants, sulfur recovery plants, metal processing.
Lead <sup>d</sup>	Monthly Quarterly	1.5 µg/m <sup>3</sup> —	— 1.5 µg/m <sup>3</sup>	Disturbs gastrointestinal system. Causes anemia, kidney disease, and neuromuscular and neurological dysfunction. Also considered a toxic air contaminant.	Primary: lead-based industrial process like battery production and smelters. Past: lead paint, leaded gasoline. Moderate to high levels of aerially deposited lead from gasoline may still be present in soils along major roads, and can be a problem if large amounts of soil are disturbed.

Notes: ppm = parts per million; µg/m<sup>3</sup> = micrograms per cubic meter; VOC = volatile organic gases; NO<sub>x</sub> = oxides of nitrogen; SO<sub>x</sub> = sulfur oxides

<sup>a</sup> Annual PM<sub>10</sub> NAAQS revoked October 2006; was 50 µg/m<sup>3</sup>. 24-hr. PM<sub>2.5</sub> NAAQS tightened October 2006; was 65 µg/m<sup>3</sup>.

<sup>b</sup> The Federal 1-hour ozone standard was revoked in 2005.

<sup>c</sup> Rounding to an integer value is not allowed for the State 8-hour CO standard. A violation occurs at or above 9.05 ppm.

<sup>d</sup> The ARB has identified lead, vinyl chloride, and the particulate matter fraction of diesel exhaust as toxic air contaminants. Diesel exhaust particulate matter is part of PM<sub>10</sub> and, in larger proportion, PM<sub>2.5</sub>. Both the ARB and USEPA have identified various organic compounds that are precursors to ozone and PM<sub>2.5</sub> as toxic air contaminants. There is no threshold level of exposure for adverse health effect determined for toxic air contaminants, and control measures may apply at ambient concentrations below any criteria levels specified for these pollutants or the general categories of pollutants to which they belong.

Sources: California Air Resources Board Ambient Air Quality Standards chart, 11/17/2008 (<http://www.arb.ca.gov/aqs/aaqs2.pdf>)

Sonoma-Marina Area Rail Transit Draft Air Pollutant Standards and Effects table, November 2005, page 3-52.

USEPA and California Air Resources Board air toxics websites, 05/17/2006



## **Existing Emission Sources**

Criteria air pollutant emission sources in the County include stationary, area, and mobile sources. According to the 2008 emissions inventory for the County, the majority of VOC and NO<sub>x</sub> emissions are attributable to mobile sources, while areawide sources are the greatest contributor of particulate matter emissions (ARB 2009d).

Major stationary sources of air pollutant emissions within the County include industrial processes, fuel combustion from electric utilities and other processes, waste disposal, surface coating and cleaning, petroleum production, and other sources. Local air districts issue permits to various types of stationary sources, which must demonstrate implementation of best available control technologies (BACT).

Areawide sources of emissions include consumer products, application of architectural coatings, residential fuel combustion, farming operations, construction and demolition, road dust, fugitive dust, landscaping, fires, and other miscellaneous sources. Paved road dust is the largest contributor to particulate matter emissions within the County.

On-road and other mobile sources are the largest contributors of ozone precursor emissions within the County. On-road sources consist of passenger vehicles, trucks, buses, and motorcycles, while off-road vehicles and other mobile sources comprise heavy-duty equipment, boats, aircraft, trains, recreational vehicles, and farm equipment. Major roadways in the County include I-80 and I-280. Major United States routes include U.S. Highway 101 and major state routes include State Route 1.

### **3.5 EXISTING AIR QUALITY — TOXIC AIR CONTAMINANTS**

Concentrations of TACs, or in federal parlance, hazardous air pollutants (HAPs), are also used as indicators of ambient-air-quality conditions. A TAC is defined as an air pollutant that may cause or contribute to an increase in mortality or in serious illness, or that may pose a hazard to human health. TACs are usually present in minute quantities in the ambient air; however, their high toxicity or health risk may pose a threat to public health even at low concentrations.

According to the *California Almanac of Emissions and Air Quality* (ARB 2009a), the majority of the estimated health risk from TACs can be attributed to relatively few compounds, the most important being PM from diesel-fueled engines (diesel PM). Diesel PM differs from other TACs in that it is not a single substance, but rather a complex mixture of hundreds of substances. Although diesel PM is emitted by diesel-fueled internal combustion engines, the composition of the emissions varies depending on engine type, operating conditions, fuel composition, lubricating oil, and whether an emission control system is present.



Unlike the other TACs, no ambient monitoring data are available for diesel PM because no routine measurement method currently exists. However, ARB has made preliminary concentration estimates based on a PM exposure method. This method uses the ARB emissions inventory's PM<sub>10</sub> database, ambient PM<sub>10</sub> monitoring data, and the results from several studies to estimate concentrations of diesel PM. In addition to diesel PM, the TACs for which data are available that pose the greatest existing ambient risk in California are benzene, 1,3-butadiene, acetaldehyde, carbon tetrachloride, hexavalent chromium, *para*-dichlorobenzene, formaldehyde, methylene chloride, and perchloroethylene.

Diesel PM poses the greatest health risk among TACs in California. Based on receptor modeling techniques, ARB estimated its health risk to be 480 excess cancer cases per million people in the SFBAAB during 2000. Since 1990, the health risk associated with diesel PM has been reduced by 36 percent in the SFBAAB. Overall, levels of most TACs, except *para*-dichlorobenzene and formaldehyde, have decreased since 1990 (ARB 2009a).

### **Mobile Source Air Toxics**

The CAA identified 188 compounds as HAPs. USEPA has assessed this expansive list of toxics and identified a group of 21 as MSATs. The MSATs are compounds emitted from highway vehicles and non-road equipment (e.g., off-road construction equipment). Some toxic compounds are present in fuel and are emitted to the air when the fuel evaporates or passes through the engine unburned. Other toxics are emitted from the incomplete combustion of fuels or as secondary combustion products. Metal air toxics also result from engine wear or from impurities in oil or gasoline. USEPA also extracted a subset of this list of 21 compounds that it now labels as the six priority MSATs. These are benzene, formaldehyde, acetaldehyde, diesel particulate matter/diesel exhaust organic gases, acrolein, and 1,3-butadiene (FHWA 2006b). However, in September 2009, FHWA released its MSAT Interim Guidance Update that identified seven compounds "with significant contributions from mobile sources that are among the national and regional-scale cancer risk drivers" (FHWA 2009a). These seven compounds are now considered the priority MSATs: acrolein, benzene, 1,3-butadiene, diesel particulate matter plus diesel exhaust organic gases (diesel PM), formaldehyde, naphthalene, and polycyclic organic matter. While these MSATs are considered the priority transportation toxics, USEPA stresses that the lists are subject to change and may be adjusted in future rules (FHWA 2006b, FHWA 2009a).

USEPA has issued a number of regulations that will dramatically decrease MSATs through cleaner fuels and cleaner engines. According to an FHWA analysis, even if the number of vehicle miles traveled (VMT) increases by 64 percent, reductions of 57–87 percent in MSATs are projected from 2000 to 2020 (FHWA 2006b). Project MSAT impacts are discussed in Chapter 4.0, "Environmental Consequences," of this analysis.

## **Asbestos**

The CAA requires USEPA to develop and enforce regulations to protect the general public from exposure to airborne contaminants that are known to be hazardous to human health. In accordance with CAA Section 112, USEPA established National Emissions Standards for Hazardous Air Pollutants (NESHAP) to protect the public. Asbestos was one of the first HAPs regulated under this section. On March 31, 1971, USEPA identified asbestos as a HAP, and on April 6, 1973, first promulgated the asbestos NESHAP in 40 Code of Federal Regulations (CFR) 61. In 1990, a revised NESHAP regulation was promulgated by USEPA.

The asbestos NESHAP regulations protect the public by minimizing the release of asbestos fibers during activities involving the processing, handling, and disposal of asbestos-containing material. Accordingly, the asbestos NESHAP specifies work practices to be followed during demolitions and renovations of all structures, installations, and buildings (excluding residential buildings that have four or fewer dwelling units). In addition, the regulations require the project applicant to notify applicable state and local agencies and/or USEPA regional offices before all demolitions or before construction that contains a certain threshold amount of asbestos.

## **Naturally Occurring Asbestos**

Serpentine is a mineral commonly found in seismically active regions of California, usually in association with ultramafic rocks and along associated faults. Certain types of serpentine occur naturally in a fibrous form known generically as asbestos. Asbestos is a known carcinogen and inhalation of asbestos may result in the development of lung cancer or mesothelioma. ARB has regulated the amount of asbestos in crushed serpentinite used in surfacing applications, such as for gravel on unpaved roads, since 1990. In 1998, new concerns were raised about health hazards from activities that disturb asbestos-bearing rocks and soil. In response, ARB revised their asbestos limit for crushed serpentines and ultramafic rock in surfacing applications from 5 percent to less than 0.25 percent and adopted a new rule requiring best practices dust control measures for activities that disturb rock and soil containing naturally occurring asbestos (NOA) (CDC 2000).

According to A General Location Guide for Ultramafic Rocks in California—Areas More Likely to Contain Naturally Occurring Asbestos (CDC 2000), the project site is not located in an area that is likely to contain NOA. Thus, hazardous exposure to asbestos-containing serpentine materials would not be a concern with the proposed project.

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## CHAPTER 4.0 – ENVIRONMENTAL CONSEQUENCES

### 4.1 PROJECT IMPACT ANALYSIS

#### Operational Impacts

As determined in the traffic study, traffic operations resulting from implementation of Alternative 2b and 4 would be the same. Therefore, the following operational impacts analysis refers to the proposed project as the build alternatives (Alternative 2b and Alternative 4).

#### Regional Air Quality Conformity

For federal or joint projects, the air quality analysis and technical report must comply with the federal CAA and the environmental document must contain a regional and a project-level air conformity statement, unless the project is exempt (see 40 CFR 93, 126-128). The proposed project must match the design, concept, and scope of the project as described in the most recent RTP and Regional Transportation Improvement Plan (RTIP).

The proposed project is included in the 2035 RTP (latest RTP update) which was found to conform by MTC on April 22, 2009. The FHWA and FTA adopted the air quality conformity finding for the 2035 RTP on May 29, 2009. MTC used the latest planning assumptions for the purpose of preparing the conformity analysis. Current and future population and employment assumptions were obtained from ABAG's latest socio-economic/land use forecast series, *Projections 2007*. MTC's latest travel demand forecast model, BAYCAST 2000, was used to estimate future vehicle activity while taking into consideration the ARB's most recent vehicle emissions inventory model, EMFAC 2007. EMAC 2007 takes into consideration the most recent available vehicle registration data. The proposed project is included in the 2035 RTP as Reference Number 230555 – Reconstruct ramps on east side of the San Francisco-Oakland Bay Bridge's Yerba Buena Island Tunnel. The project is also included in MTC financially constrained 2009 TIP on page 38 as TIP ID SF-070027 – Yerba Buena Island Ramp Improvements. The original MTC 2009 TIP, which includes the proposed project, was found to conform by FHWA and FTA on November 17, 2008. Revisions to the MTC 2009 TIP following FHWA and FTA's decision did not affect the proposed project. The year the project is expected to open to traffic is consistent with the project's TIP listing. The design concept and scope of the proposed project is consistent with the project description in the 2035 RTP, the 2009 TIP and the assumptions in the MTC regional emissions analysis.

## **Project-Level Conformity**

The Transportation Conformity Rule requires a determination that federal projects not cause or contribute to any new localized CO, PM<sub>10</sub>, and/or PM<sub>2.5</sub> violations or increase the frequency or severity of any existing CO, PM<sub>10</sub>, and/or PM<sub>2.5</sub> violations in CO, PM<sub>10</sub>, and PM<sub>2.5</sub> nonattainment and maintenance areas.

A project-level conformity analysis must be completed to determine the potential for a CO and PM “hot spot.” The SFBAAB is currently designated as a maintenance area for the CO NAAQS and therefore a CO “hot spot” analysis is required under the USEPA Transportation Conformity Rule. An analysis of the potential for a CO “hot spot” was performed below consistent with the Protocol. For PM<sub>10</sub>, the SFBAAB is unclassified with respect to the NAAQS. For PM<sub>2.5</sub>, the SFBAAB was previously designated as attainment for the 65 µg/m<sup>3</sup> standard; however, on October 9, 2009, USEPA published a final ruling in the Federal Register designating the SFBAAB as nonattainment for the 2006 35 µg/m<sup>3</sup> 24-hour standard. The ruling will become effective 30 days after October 9, 2009. As a result of the new designation, a PM “hot spot” analysis was performed for the proposed project in accordance to the PM Guidance. This analysis was performed consistent with the USEPA and FHWA’s PM Guidance (FHWA 2006a).

## **Carbon Monoxide**

The Protocol provides procedures and guidelines for use by agencies to evaluate the potential localized CO impacts of a transportation project (UCD ITS 1997). The Protocol provides decision flow charts designed to assist the lead agency in evaluating requirements that specifically apply to a proposed project. An examination of each flow chart inquiry as it pertains to the proposed project is provided below. The Protocol states that the determination of project-level CO impacts should be carried out in accordance with the Local CO Analysis flow charts shown as Figure 3 of the Protocol.

The procedures of Section 4 in Figure 3 of the Protocol are provided for the proposed project to identify level of effort required.

### **Section 4, Local CO Analysis**

#### *Level 1*

*Is the project in a CO nonattainment area?*

No, the SFBAAB has attained the federal CO standard, but is currently a maintenance area for the CO standard, as shown in Table 2 of this analysis. Go to next question.

*Was the area redesignated as "attainment" after the 1990 Clean Air Act?*

Yes, the SFBAAB was redesignated as attainment in 1998.

*Has "continued attainment" been verified with the local Air District (if appropriate)?*

Yes. ARB's "2004 Revision to the California State Implementation Plan for Carbon Monoxide" demonstrates continued attainment of the CO standard in 10 areas including the SFBAAB. Go to Level 7.

#### *Level 7*

##### *4.7.1: Does the project worsen air quality?*

The guidance for this question states: "Only those projects that are likely to worsen air quality necessitate further analysis." To determine whether a project is likely to worsen air quality for the area substantially affected by the project, the guidance asks the following questions:

*Would "the project significantly increase the percentage of vehicles operating in cold start mode"? An increase of as little as 2 percent should be considered significant.*

No. The proposed project does not involve development of housing, employment centers, or other attractions and, thus, would not generate traffic. Rather, the proposed project would maintain the functional role of the YBI on- and off-ramps while satisfying the seismic requirements and highway design standards and improving traffic operations and safety. The proposed on- and off-ramps are not anticipated to increase the percentage or total number of vehicles operating in cold start mode.

*Would "the project significantly increase traffic volumes?" Increases in traffic volumes in excess of 5 percent or more should be considered potentially significant. Additionally, an increase of less than 5 percent may still be potentially significant, if there is also a reduction in average speeds.*

No. The proposed project would not develop any land uses that would generate vehicle trips and increase traffic volumes on the on- and off-ramps. The proposed ramps would add additional capacity to the westbound on-ramp for the SFOBB; however, because the ramps would be metered, the proposed project would not increase traffic volumes entering the SFOBB. Therefore, according to the criterion described above, the proposed project would not adversely affect on traffic volumes.



*Would “the project worsen traffic flow”? A reduction in average speeds of 3 to 50 [miles per hour] mph or an increase in average delay at an intersection should be regarded as worsening traffic flow.*

Yes. The proposed project would not worsen traffic flow on or off of the SFOBB because only the same number of vehicles exiting the SFOBB would be allowed to enter. In other words, the metering system for the proposed on-ramp would only allow a vehicle to enter the SFOBB if another vehicle exited the SFOBB. Therefore, with implementation of proper ramp metering, the proposed project is not anticipated to adversely affect the traffic operations of the SFOBB. However, the proposed metering system could worsen traffic flow on the on-ramp due to vehicles idling prior to entering the SFOBB. Vehicles attempting to enter the SFOBB would have to idle at the proposed meter until another vehicle exits off of the SFOBB. Therefore, although the proposed metering system would not be anticipated to worsen traffic flow on the SFOBB due to a one-to-one ratio of vehicles entering and exiting at the Yerba Buena exit, the metering system would worsen traffic flow on the on-ramp. Thus, the proposed project could worsen traffic flow.

According to the criteria discussed above, implementation of the proposed project could potentially worsen air quality. Proceed to Question 4.7.2.

*4.7.2 Would the project result in higher CO concentrations than those existing in the region at the time of attainment demonstration?*

The guidance for this question states: “Projects potentially creating CO concentrations higher than those existing within the region at the time of attainment demonstration should proceed to Section 4.7.3; other projects should be deemed satisfactory and no further analysis is needed.” In order to answer the question, the Protocol recommends that the features of the proposed project are compared with an existing project in region. If the project features of the “build” scenario would be less likely to cause a CO “hot spot” than the existing worst-case project, then there is no reason to expect higher concentrations of CO at the proposed project location. Table 4 presents the conditions and parameters of the proposed on- and off-ramps and the U.S. Route 101 southbound on- and off-ramps at Blossom Hill Road for comparison purposes.

**Table 4. Comparison of Ramp Conditions**

	Parameters	Yerba Buena Island Build Alternatives	U.S. Route 101 – Blossom Hill Road Southbound Ramps
A	Receptor Distance	650 ft.	250 ft.
B	Roadway Geometry	2 lanes on-ramp 1 lane off-ramp	1 lanes on-ramp 3 lanes off-ramp
C	Worst-Case Meteorology	Coastal Valley	Coastal Valley
D	AADT Volumes	3,040 (2008) <sup>1</sup> 16,730 (2035) <sup>1</sup>	26,400 (2007) <sup>2</sup>
E	Hot/Cold Starts Percentage	75/25 on-ramp 85/15 off-ramp	75/25 on-ramp 85/15 off-ramp
F	Percent Heavy Duty Gasoline Trucks	0.76%	1.8% <sup>3</sup>
G	8-Hour Background CO	2.3 ppm (2006–2008)	2.9 ppm (2006–2008) <sup>4</sup>

Notes: ft = feet; AADT = annual average daily trips; ppm = parts per million; CO = carbon monoxide

- 1 Average daily trips (ADT) were calculated by multiplying the PM peak hour traffic using the westbound on- and off-ramps and a k factor of 10. ADT is anticipated to be comparable to AADT. However, the adjustment made to calculate AADT would not be expected to cause the proposed project's AADT to exceed the comparison project's AADT.
- 2 Traffic volumes from Caltrans were provided in ADT, which is expected to be comparable to AADT. Any adjustment made to calculate AADT would not be expected to cause the AADT to be below the proposed project's AADT. The ramp volume shown only represents the southbound on- and off-ramps at U.S. Route 101 and Blossom Hill Road.
- 3 Percent of heavy-duty gasoline trucks for the comparison project was determined using the CO Protocol methodology and truck volumes and distributions from the San Jose, Junction Route 85, Bernal Road Interchange from Caltrans 2007 Truck Traffic data, which is the closest data point to the comparison project.
- 4 Background 8-hour CO concentration was obtained from the Jackson Street monitoring station in San Jose, California, which is the closest monitoring station to the Blossom Hill Road southbound ramps.

Sources: Caltrans 2009a; Caltrans 2009b; UCD ITS 1997; ARB 2009b

As shown above, all conditions in items A through G for Question 4.7.2 have been satisfied; therefore, there is no reason to expect higher CO concentrations at the project location than at the U.S. Route 101 on- and off-ramps at Blossom Hill Road. Thus, the proposed project would not cause an exceedance of the state or federal CO standards.

**4.7.3: Would the project involve signalized intersections at Level of Service (LOS) E, or F?**

No, the proposed project would not impact any signalized intersections. Although metering is proposed for the on-ramp, the on-ramp would be considered a roadway segment for which the Protocol does not apply. Proceed to Question 4.7.4.

**4.7.4: Would the project result in worsening of signalized intersections LOS to E, or F?**

No, the proposed project would not impact any signalized intersections. Although metering is proposed for the on-ramp, the on-ramp would be considered a roadway segment for which the Protocol does not apply. Proceed to Question 4.7.5.

**4.7.5: Would there be any other reasons the project could cause adverse air quality impacts?**

The guidance for this question states: "Under certain special conditions, there still may be cause for concern about the air quality impacts of the project even if no further analysis



was required according to Sections 4.7.3 and 4.7.4.” As discussed above, the proposed project would not generate vehicle trips or create any special conditions (e.g., urban street canyon, increase number of heavy-duty trucks, and proximity to large stationary sources of CO) that would increase CO concentrations at local signalized intersections. Therefore, it is determined there are no other reasons that the proposed project would cause adverse air quality impacts with respect CO concentrations.

According to the traffic study, the proposed project would not reduce the LOS of any signalized intersection to LOS E or F. In addition, no special conditions would contribute to the proposed project causing an adverse air quality impact with respect to CO. Therefore, the proposed build alternatives would not cause violations of the federal or state CO standards and further analysis of localized CO impacts is not necessary.

### **Particulate Matter**

On March 10, 2006, USEPA published a final rule that establishes the transportation conformity criteria and procedures for determining which transportation projects must be analyzed for local air quality impacts in PM<sub>2.5</sub> and PM<sub>10</sub> nonattainment and maintenance areas. Based on that rule, USEPA and FHWA published the PM Guidance (FHWA 2006a). In December 2008, USEPA designated the SFBAAB as nonattainment for the new 35 µg/m<sup>3</sup> PM<sub>2.5</sub> standard. On October 9, 2009, USEPA published the final ruling in the Federal Register, which officially designated the SFBAAB as nonattainment for the 2006 PM<sub>2.5</sub> standard. It should be noted that a “hot spot” analysis for particulate matter is not currently required for project conformity until December 2010 to allow a one-year conformity grace period; however, in anticipation of the nonattainment designation, a “hot spots” analysis was performed for the proposed project in accordance to the PM Guidance. In accordance with the nonattainment designation and pursuant to the transportation conformity requirements, the local PM impacts of the proposed project are analyzed in accordance with the PM Guidance.

A “hot spot” analysis is defined in 40 CFR 93.101 as an estimation of likely future localized PM<sub>2.5</sub> or PM<sub>10</sub> pollutant concentrations and a comparison of those concentrations to the relevant air quality standards. A “hot spot” analysis assesses the air quality impacts on a scale smaller than an entire nonattainment or maintenance area, including, for example, congested roadway intersections and highways or transit terminals. Such an analysis demonstrates that a transportation project meets CAA conformity requirements to support state and local air quality goals with respect to potential localized air quality impacts. When a “hot spot” analysis is required, it is included within the project-level conformity determination that is made by FHWA and FTA.



The PM Guidance document describes qualitative “hot spot” analyses. Quantitative PM<sub>2.5</sub> and PM<sub>10</sub> “hot spot” analyses will be required when appropriate methods and modeling guidance are available. Qualitative “hot spot” analyses involve more streamlined reviews of local factors such as local monitoring data near a proposed project location.

Since issuing the March 2006 guidance, a lawsuit was filed challenging a project’s conformity determination, including the project’s PM<sub>2.5</sub> “hot spot” analysis that relied on Method A (comparison to another location with similar characteristics). Method A is described in question 4.1 of the March 2006 guidance. As part of a settlement agreement on that lawsuit (Environmental Defense, et al. v. USDOT, et al., No. 08-1107 (4th Cir., dismissed Nov. 17, 2008)), FHWA agreed to issue a clarification on a specific schedule, in coordination with USEPA, related to the March 2006 guidance. This clarification does not supersede the March 2006 guidance or the March 10, 2006 Final Transportation Conformity Rule; it only further explains how to implement the existing guidance and the “hot spot” analysis requirements in the final rule. The clarification also does not create any new requirements and does not serve as guidance for PM<sub>2.5</sub> and PM<sub>10</sub> quantitative “hot spot” analyses (FHWA 2009b).

#### Projects of Air Quality Concern

To meet statutory requirements, the March 10, 2006, final rule requires PM<sub>2.5</sub> and PM<sub>10</sub> “hot spot” analyses to be performed for POAQC. Qualitative “hot spot” analyses would be done for these projects. Projects not identified as POAQCs are considered to have met statutory requirements without any further “hot spot” analyses.

The PM Guidance defines POAQCs as projects within a federally designated PM<sub>2.5</sub> or PM<sub>10</sub> nonattainment or maintenance area that are funded or approved by FHWA or FTA, and are one of the following types of projects:

- New or expanded highway projects that have a significant number of or significant increase in diesel vehicles;
- Projects affecting intersections that are LOS D, E, or F with a significant number of diesel vehicles, or those that will change to LOS D, E, or F, because of increased traffic volumes from a significant number of diesel vehicles related to the project;
- New bus and rail terminals, and transfer points, that have a significant number of diesel vehicles congregating at a single location;
- Expanded bus and rail terminals, and transfer points, that significantly increase the number of diesel vehicles congregating at a single location; and

- Projects in, or affecting locations, areas, or categories of sites that are identified in the PM<sub>2.5</sub> applicable implementation plan or implementation plan submission, as appropriate, as sites of violation or possible violation.

Appendix A of the PM Guidance contains examples of POAQC's and examples of projects that are not an air quality concern. Under the example of POAQC, a significant volume for a new highway or expressway is defined as facilities with an annual average daily traffic (AADT) volume of 125,000 or more, and a significant number of diesel vehicles is defined as 8 percent or more of the total AADT is diesel truck traffic.

The proposed project is not a land use project that is anticipated to generate vehicle trips. The traffic study analyzed the future (year 2035) traffic volumes that would use the proposed ramps to access YBI and TI. The total number of vehicles accessing YBI and TI via the proposed ramps during the p.m. peak hour in 2035 would be 3,835 vehicles, which would translate to approximately 38,350 average daily trips (ADT) (AECOM Transportation 2009). It should be noted that this analysis uses ADT rather than AADT, which is used to define traffic volumes for a POAQC. The ADT associated with the project is anticipated to be comparable to the AADT. Nevertheless, the ADT associated with the proposed project is approximately 25 percent of the AADT threshold; therefore, any adjustments made to the ADT to calculate AADT would still not be expected to result in an AADT that exceeds 125,000 AADT. Therefore, the proposed project would not exceed the first threshold for a POAQC. However, it is acknowledged that traffic volumes on the SFOBB during the p.m. peak hour would increase from 16,351 vehicles in 2008 to 19,350 vehicles in 2035, which would translate into 193,500 ADT. Although the SFOBB traffic volumes would exceed the 125,000-AADT threshold, those traffic volumes have been analyzed in a previous environmental analysis. As discussed above, the metering system proposed for the on-ramps would limit the amount of vehicles entering the SFOBB to the amount of vehicles exiting the SFOBB and therefore would not add a substantial traffic volume to the SFOBB that would cause a PM "hot spot."

In addition, the vehicle trips along the proposed ramps would not be anticipated to cause an increase in the number of diesel vehicles. The proposed project is not a land use project that would generate an increased number of diesel trucks traveling on the ramps. As discussed in the traffic study, future traffic volumes would increase on the SFOBB and the proposed ramps, which would also increase the number of diesel trucks traveling along the SFOBB and the proposed ramps. However, the percentage of diesel trucks of the total traffic volume is anticipated to remain the same. It should be noted that the TI and YBI Redevelopment Plan would develop land uses on YBI and TI that could potentially increase the number of heavy-duty diesel trucks traveling on the proposed ramps to deliver goods. Therefore, although implementing the proposed project would not directly increase diesel vehicle traffic, future



development on TI and YBI could increase the number and percent of diesel vehicle traffic. Because implementing the proposed project would not significantly increase AADT or diesel truck traffic along the proposed on- and off-ramps, the proposed project does not meet the criteria of a POAQC as defined in the PM Guidance and would not significantly increase the potential for a PM "hot spot." In addition, the proposed project would not involve developing a land use that would alter the vehicle mix traveling along the ramps.

### **Mobile Source Air Toxics**

In addition to CO, MSAT emissions are of local concern. MSATs are compounds emitted from highway vehicles and non-road equipment. In February 2006, FHWA issued the FHWA Interim Guidance to advise when and how to analyze MSAT in the NEPA process for highways. However, USEPA currently recommends following the March 2007 report entitled "Analyzing, Documenting, and Communicating the Impacts of Mobile Source Air Toxic Emissions in the NEPA Process." FHWA and USEPA are currently undergoing mediation on the FHWA Interim Guidance. In September 2009, FHWA released an update to the FHWA Interim Guidance (i.e., Interim Guidance Update). The Interim Guidance Update did not change any project analysis thresholds, recommendations, or guidelines; however, an updated set of seven priority MSATs were identified as having significant contributions from mobile sources that are among the national- and regional-scale cancer risk drivers.

Evaluating the environmental and health impacts from MSATs on a proposed highway project may involve several key elements, including emissions modeling, dispersion modeling in order to estimate ambient concentrations resulting from the estimated emissions, exposure modeling in order to estimate human exposure to the estimated concentrations, and then final determination of health impacts based on the estimated exposure.

The following is an excerpt from Appendix C of the FHWA Interim Guidance (FHWA 2006b):

#### **Introduction to MSAT**

In addition to the criteria air pollutants for which there are NAAQS, USEPA also regulates air toxics. Most air toxics originate from human-made sources, including on-road mobile sources, non-road mobile sources (e.g., airplanes), area sources (e.g., dry cleaners) and stationary sources (e.g., factories or refineries).

MSATs are a subset of the 188 air toxics defined by the CAA. The MSATs are compounds emitted from highway vehicles and non-road equipment. Some toxic compounds are present in fuel and are emitted to the air when the fuel evaporates or passes through the engine unburned. Other toxics are emitted from the incomplete



combustion of fuels or as secondary combustion products. Metal air toxics also result from engine wear or from impurities in oil or gasoline.

USEPA is the lead Federal Agency for administering the CAA and has certain responsibilities regarding the health effects of MSATs. USEPA issued a Final Rule on Controlling Emissions of Hazardous Air Pollutants from Mobile Sources, 66 FR 17229 (March 29, 2001). This rule was issued under the authority in Section 202 of the CAA. In its rule, USEPA examined the impacts of existing and newly promulgated mobile source control programs, including its reformulated gasoline (RFG) program, its national low emission vehicle (NLEV) standards, its Tier 2 motor vehicle emissions standards and gasoline sulfur control requirements, and its proposed heavy duty engine and vehicle standards and on-highway diesel fuel sulfur control requirements. Between 2000 and 2020, FHWA projects that even with a 64-percent increase in VMT, these programs would reduce on-highway emissions of benzene, formaldehyde, 1,3-butadiene, and acetaldehyde by 57–65 percent, and would reduce on-highway diesel PM emissions by 87 percent.

As a result, USEPA concluded that no further motor vehicle emissions standards or fuel standards were necessary to further control MSATs. The agency is preparing another rule under authority of CAA Section 202(l) that will address these issues and could make adjustments to the full 21 and the primary six MSATs.

#### Incomplete or Unavailable Information for Project-Specific MSAT Health Impact Analysis

In FHWA's view, information is incomplete or unavailable to credibly predict the project-specific health impacts due to changes in MSAT emissions associated with a proposed set of highway alternatives. The outcome of such an assessment, adverse or not, would be influenced more by the uncertainty introduced into the process through assumption and speculation rather than any genuine insight into the actual health impacts directly attributable to MSAT exposure associated with a proposed action.

The U.S. Environmental Protection Agency (EPA) is responsible for protecting the public health and welfare from any known or anticipated effect of an air pollutant. They are the lead authority for administering the Clean Air Act and its amendments and have specific statutory obligations with respect to hazardous air pollutants and MSAT. The EPA is in the continual process of assessing human health effects, exposures, and risks posed by air pollutants. They maintain the Integrated Risk Information System (IRIS), which is "a compilation of electronic reports on specific substances found in the environment and their potential to cause human health effects" (EPA, <http://www.epa.gov/ncea/iris/index.html>). Each report contains assessments of non-cancerous and cancerous

effects for individual compounds and quantitative estimates of risk levels from lifetime oral and inhalation exposures with uncertainty spanning perhaps an order of magnitude.

Other organizations are also active in the research and analyses of the human health effects of MSAT, including the Health Effects Institute (HEI). Two HEI studies are summarized in Appendix D of FHWA's Interim Guidance Update on Mobile source Air Toxic Analysis in NEPA Documents. Among the adverse health effects linked to MSAT compounds at high exposures are cancer in humans in occupational settings; cancer in animals; and irritation to the respiratory tract, including the exacerbation of asthma. Less obvious is the adverse human health effects of MSAT compounds at current environmental concentrations (HEI, <http://pubs.healtheffects.org/view.php?id=282>) or in the future as vehicle emissions substantially decrease (HEI, <http://pubs.healtheffects.org/view.php?id=306>).

The methodologies for forecasting health impacts include emissions modeling; dispersion modeling; exposure modeling; and then final determination of health impacts - each step in the process building on the model predictions obtained in the previous step. All are encumbered by technical shortcomings or uncertain science that prevents a more complete differentiation of the MSAT health impacts among a set of project alternatives. These difficulties are magnified for lifetime (i.e., 70 year) assessments, particularly because unsupportable assumptions would have to be made regarding changes in travel patterns and vehicle technology (which affects emissions rates) over that time frame, since such information is unavailable. The results produced by the EPA's MOBILE6.2 model, the California EPA's Emfac2007 model, and the EPA's DraftMOVES2009 model in forecasting MSAT emissions are highly inconsistent. Indications from the development of the MOVES model are that MOBILE6.2 significantly underestimates diesel particulate matter (PM) emissions and significantly overestimates benzene emissions.

Regarding air dispersion modeling, an extensive evaluation of EPA's guideline CAL3QHC model was conducted in an NCHRP study ([http://www.epa.gov/scram001/dispersion\\_alt.htm#hyroad](http://www.epa.gov/scram001/dispersion_alt.htm#hyroad)), which documents poor model performance at ten sites across the country - three where intensive monitoring was conducted plus an additional seven with less intensive monitoring. The study indicates a bias of the CAL3QHC model to overestimate concentrations near highly congested intersections and underestimate concentrations near uncongested intersections. The consequence of this is a tendency to overstate the air quality benefits of mitigating congestion at intersections. Such poor model performance is less difficult to manage for demonstrating compliance with National Ambient Air Quality Standards for relatively short time frames than it is for



forecasting individual exposure over an entire lifetime, especially given that some information needed for estimating 70-year lifetime exposure is unavailable. It is particularly difficult to reliably forecast MSAT exposure near roadways, and to determine the portion of time that people are actually exposed at a specific location.

There are considerable uncertainties associated with the existing estimates of toxicity of the various MSAT, because of factors such as low-dose extrapolation and translation of occupational exposure data to the general population, a concern expressed by HEI (<http://pubs.healtheffects.org/view.php?id=282> ). As a result, there is no national consensus on air dose-response values assumed to protect the public health and welfare for MSAT compounds, and in particular for diesel PM. The EPA (<http://www.epa.gov/risk/basicinformation.htm#g>) and the HEI (<http://pubs.healtheffects.org/getfile.php?u=395>) have not established a basis for quantitative risk assessment of diesel PM in ambient settings.

There is also the lack of a national consensus on an acceptable level of risk. The current context is the process used by the EPA as provided by the Clean Air Act to determine whether more stringent controls are required in order to provide an ample margin of safety to protect public health or to prevent an adverse environmental effect for industrial sources subject to the maximum achievable control technology standards, such as benzene emissions from refineries. The decision framework is a two-step process. The first step requires EPA to determine a “safe” or “acceptable” level of risk due to emissions from a source, which is generally no greater than approximately 100 in a million. Additional factors are considered in the second step, the goal of which is to maximize the number of people with risks less than 1 in a million due to emissions from a source. The results of this statutory two-step process do not guarantee that cancer risks from exposure to air toxics are less than 1 in a million; in some cases, the residual risk determination could result in maximum individual cancer risks that are as high as approximately 100 in a million. In a June 2008 decision, the U.S. Court of Appeals for the District of Columbia Circuit upheld EPA’s approach to addressing risk in its two step decision framework. Information is incomplete or unavailable to establish that even the largest of highway projects would result in levels of risk greater than safe or acceptable.

Because of the limitations in the methodologies for forecasting health impacts described, any predicted difference in health impacts between alternatives is likely to be much smaller than the uncertainties associated with predicting the impacts. Consequently, the results of such assessments would not be useful to decision makers, who would need to weigh this information against project benefits, such as reducing traffic congestion,



accident rates, and fatalities plus improved access for emergency response, that are better suited for quantitative analysis.

### Summary of Existing Credible Scientific Evidence Relevant to Evaluating the Impacts of MSATs

Research into the health impacts of MSATs is ongoing. For different emission types, there are a variety of studies that show that some either are statistically associated with adverse health outcomes through epidemiological studies (frequently based on emissions levels found in occupational settings) or that animals demonstrate adverse health outcomes when exposed to large doses.

Exposure to toxics has been a focus of a number of USEPA efforts. Most notably, the agency conducted the National Air Toxics Assessment (NATA) in 1996 to evaluate modeled estimates of human exposure applicable to the county level. While not intended for use as a measure of or benchmark for local exposure, the modeled estimates in the NATA database best illustrate the levels of various toxics when aggregated to a national or State level.

The USEPA is in the process of assessing the risks of various kinds of exposures to these pollutants. The USEPA IRIS is a database of human health effects that may result from exposure to various substances found in the environment. The IRIS database is located at <http://www.epa.gov/iris>. The following toxicity information for the six prioritized MSATs was taken from the IRIS database *Weight of Evidence Characterization* summaries. This information is taken verbatim from USEPA's IRIS database and represents the Agency's most current evaluations of the potential hazards and toxicology of these chemicals or mixtures, unless noted otherwise.

- **Benzene** is characterized as a known human carcinogen.
- The potential carcinogenicity of **acrolein** cannot be determined because the existing data are inadequate for an assessment of human carcinogenic potential for either the oral or inhalation route of exposure.
- **Formaldehyde** is a probable human carcinogen, based on limited evidence in humans, and sufficient evidence in animals.
- **1,3-butadiene** is characterized as carcinogenic to humans by inhalation.
- **Acetaldehyde** is a probable human carcinogen based on increased incidence of nasal tumors in male and female rats and laryngeal tumors in male and female hamsters after inhalation exposure.

- **Diesel PM exhaust** is likely to be carcinogenic to humans by inhalation from environmental exposures. Diesel exhaust as reviewed in this document is the combination of diesel particulate matter and diesel exhaust organic gases.
- **Diesel exhaust** also represents chronic respiratory effects, possibly the primary noncancer hazard from MSATs. Prolonged exposures may impair pulmonary function and could produce symptoms, such as cough, phlegm, and chronic bronchitis. Exposure relationships have not been developed from these studies.
- **Naphthalene** is classified in Group C, a possible human carcinogen. This is based on the inadequate data of carcinogenicity in humans exposed to naphthalene via the oral and inhalation routes, and the limited evidence of carcinogenicity in animals via the inhalation route.
- Epidemiological studies have shown an increase in lung cancer cases for individuals exposed to **polycyclic organic matter** sources such as coke oven emissions, roof tar emissions, and cigarette smoke. Seven polycyclic organic matter compounds have been classified as Group B2, probable human carcinogens (USEPA 2009d).

There have been other studies that address MSAT health impacts in proximity to roadways. The Health Effects Institute, a nonprofit organization funded by USEPA, FHWA, and industry, has undertaken a major series of studies to research near-roadway MSAT “hot spots,” the health implications of the entire mix of mobile source pollutants, and other topics. The final summary of the series is not expected for several years.

Some recent studies have reported that proximity to roadways is related to adverse health outcomes — particularly respiratory problems (South Coast Air Quality Management District, Multiple Air Toxic Exposure Study-II (2000); Highway Health Hazards, The Sierra Club (2004) summarizing 24 Studies on the relationship between health and air quality); NEPA’s Uncertainty in the Federal Legal Scheme Controlling Air Pollution from Motor Vehicles, Environmental Law Institute, 35 ELR 10273 (2005) with health studies cited therein).

Much of this research is not specific to MSATs, instead surveying the full spectrum of both criteria air and other pollutants.

This document provides a qualitative assessment of MSAT emissions relative to the various alternatives and has acknowledged that all the project alternatives may result in increased exposure to MSAT emissions in certain locations.

It is possible to qualitatively assess the levels of future MSAT emissions under the project. A qualitative analysis provides a basis for identifying and comparing the potential differences among MSAT emissions, if any, from the various alternatives. The qualitative assessment presented below is derived in part from a study conducted by the FHWA entitled *A Methodology for Evaluating Mobile Source Air Toxic Emissions Among Transportation Project Alternatives* (FHWA 2009c), found at: [www.fhwa.dot.gov/environment/airtoxic/msatcompare/msatemissions.htm](http://www.fhwa.dot.gov/environment/airtoxic/msatcompare/msatemissions.htm)

### Evaluation of Project MSAT Potential

The FHWA has developed a tiered approach (FHWA Interim Guidance and Interim Guidance Update) for analyzing MSATs in NEPA documents. This tiered approach has not been altered in the Interim Guidance Update. Depending on the specific project circumstances, FHWA has identified three levels of analysis:

- Category 1: No analysis for projects with no potential for meaningful MSAT effects,
- Category 2: Qualitative analysis for projects with low potential MSAT effects, or
- Category 3: Quantitative analysis to differentiate alternatives for projects with higher potential MSAT effects.

Category 1 is limited to projects that qualify as a categorical exclusion under 23 CFR 771.117(c); are exempt under the CAA conformity rule under 40 CFR 93.126; or have no meaningful impacts on traffic volumes or vehicle mix. The proposed project does not meet any of the Category 1 requirements.

For a project to be of the magnitude to have a higher potential for MSAT effects, Category 3, a project must:

- Create or significantly alter a major intermodal freight facility that has the potential to concentrate high levels of diesel particulate matter in a single location; or
- Create new or add significant capacity to urban highways such as interstates, urban arterials, or urban collector-distributor routes with traffic volumes where the AADT is projected to be in the range of 140,000 to 150,000, or greater, by the design year; and
- be proposed to be located in proximity to populated areas or in rural areas, in proximity to concentrations of vulnerable populations (i.e., schools, nursing homes, hospitals).



The proposed project would not alter a major intermodal freight facility or add significant capacity to urban highways where AADT is projected to be above 140,000. Therefore, by default, the proposed project would be classified as a Category 2 project with low potential MSAT effects. A Category 2 MSAT analysis is recommended for projects that would improve operations of highway, transit or freight without adding substantial new capacity or without creating a facility that is likely to meaningfully increase emissions. A qualitative MSAT analysis should be performed for Category 2 projects discussing the expected effect of the project on traffic volumes, vehicle mix, or routing of traffic. The analysis should also qualitatively evaluate the change in MSAT emissions based on the expected effect of the project on VMT, vehicle mix, and vehicle speeds.

### Project-Specific MSAT Impact Analysis

The amount of MSATs emitted would be proportional to the VMT, assuming that other variables such as fleet mix are the same for each alternative. In addition, the FHWA's *A Methodology for Evaluating Mobile Source Air Toxic Emissions Among Transportation Project Alternatives* study concluded that the most important factors affecting MSAT emissions are VMT and levels of traffic congestion (FHWA 2009c). A higher level of traffic congestion and reduced vehicle speeds were found to increase emission factors of all seven priority MSATs except for diesel particulate matter. The emission rate for diesel particulate matter is not as dependent on speeds as the other MSATs. Based on a review of the traffic study, year 2035 (i.e., buildout year) traffic volumes and associated VMT estimated for the two Build Alternatives and the No Build Alternative would be similar. The reason being, although the project would add additional capacity, the project itself would not generate trips or attract new trips as a result of its completion. In addition, the proposed project would not develop a land use that would alter the vehicle mix traveling along the ramps. Therefore, MSAT emissions associated with each alternative would vary as a function of vehicle congestion along the on- and off-ramps. The traffic study determined that compared with the No Build Alternative, the average operating speed on the on-ramp would be lower for the Build condition due to proposed metering system (i.e., one-to-one ratio of vehicles exiting and entering the SFOBB). Under the No Build Alternative (i.e., no metering), the average vehicle speed on the on-ramp would be slightly higher due to the lack of metering. However, it should be noted that the free flowing and unmetered on-ramp under the No Build Alternative could cause congestion and reduced speeds on the SFOBB. The operating speeds on the SFOBB were not analyzed in the traffic study. With respect to the operation of the on-ramp, the two build alternatives would result in more delays and queuing as a result of the proposed metering for the on-ramp, and therefore a lower average operating speed. According the *A Methodology for Evaluating Mobile Source Air Toxic Emissions Among Transportation Project Alternatives* study, it is anticipated that the build alternatives would result in higher emissions of MSATs than the No Build Alternative.

Regardless of the alternative chosen, emissions would likely be lower than present levels in the design year as a result of USEPA's national control programs that are projected to reduce MSAT emissions by 57–87 percent between 2000 and 2020 (FHWA 2006b). This reduction in MSAT emissions is projected to occur even with a 64-percent increase in VMT. Local conditions may differ from these national projections in terms of fleet mix and turnover, VMT growth rates, and local control measures. However, the magnitude of the USEPA-projected reductions is so great (even after accounting for VMT growth) that MSAT emissions in the study area are likely to be lower in the future in nearly all cases.

### **Construction Impacts**

During construction, short-term degradation of air quality may occur due to the release of particulate emissions (airborne dust) generated by excavation, grading, hauling, and various other activities. Emissions from construction equipment also are anticipated and would include CO, NO<sub>x</sub>, VOCs, directly emitted PM<sub>10</sub> and PM<sub>2.5</sub>, and TACs such as diesel exhaust particulate matter. Ozone is a regional pollutant that is derived from NO<sub>x</sub> and VOCs in the presence of sunlight. To minimize air quality impacts from construction activities, control measure will be implemented as specified in Caltrans Standard Specifications, Section 14-9.01, "Air Pollution Control," and Section 14-9.02, "Dust Control."

Site preparation and roadway construction would involve clearing, cut-and-fill activities, grading, removing or improving existing roadways, and paving roadway surfaces. Construction-related effects on air quality from most highway projects would be greatest during the site preparation phase because most engine and fugitive emissions are associated with the excavation, handling, and transport of soils to and from the site. If not properly controlled, these activities would temporarily generate PM<sub>10</sub>, PM<sub>2.5</sub>, and small amounts of CO, SO<sub>2</sub>, NO<sub>x</sub>, and VOCs. Sources of fugitive dust would include disturbed soils at the construction site and trucks carrying uncovered loads of soils. Unless properly controlled, vehicles leaving the site would deposit mud on local streets, which could be an additional source of airborne dust after it dries. PM<sub>10</sub> emissions would vary from day to day, depending on the nature and magnitude of construction activity and local weather conditions. PM<sub>10</sub> emissions would depend on soil moisture, silt content of soil, wind speed, and the amount of equipment operating. Larger dust particles would settle near the source, while fine particles would be dispersed over greater distances from the construction site.

Construction activities for large development projects are estimated by the USEPA to add 1.2 tons of fugitive dust per acre of soil disturbed per month of activity. If water or other soil stabilizers are used to control dust, the emissions can be reduced by up to 50 percent. Caltrans' Standard Specifications (Section 14) pertaining to dust minimization requirements requires use



of water or dust palliative compounds and would reduce potential fugitive dust emissions during construction.

In addition to dust-related PM<sub>10</sub> emissions, heavy trucks and construction equipment powered by gasoline and diesel engines would generate CO, SO<sub>2</sub>, NO<sub>x</sub>, VOCs and some soot particulate (PM<sub>10</sub> and PM<sub>2.5</sub>) in exhaust emissions. These emissions would be temporary and limited to the immediate area surrounding the construction site. If construction activities were to last longer than 2 years and/or substantially affect traffic due to detours, road closures, and/or temporary terminations, the potential for a CO and PM “hot spot” should be analyzed. Construction of the proposed project is scheduled to last approximately 2 years and would not require substantial detours, road closures, and/or temporary terminations due to the proposed ramps being located in different areas than the existing ramp. In other words, the existing ramps could operate under current conditions while the new ramps are constructed to avoid substantial alternations to traffic flow. Therefore, construction activities were not considered in the CO or PM “hot spot” analyses.

SO<sub>2</sub> is generated by oxidation during combustion of organic sulfur compounds contained in diesel fuel. Off-road diesel fuel meeting federal standards can contain up to 5,000 ppm of sulfur, whereas on-road diesel is restricted to less than 15 ppm of sulfur. However, under California law and ARB regulations, off-road diesel fuel used in California must meet the same sulfur and other standards as on-road diesel fuel, so SO<sub>2</sub>-related issues due to diesel exhaust would be minimal. Some phases of construction, particularly asphalt paving, would result in short-term odors in the immediate area of each paving site(s). Such odors would be quickly dispersed below detectable thresholds as distance from the site(s) increases.

### **Local Emissions**

According to 40 CFR, Part 51, Section 93.123 (5), CO, PM<sub>10</sub>, and PM<sub>2.5</sub> “hot spot” analyses are not required for construction-related activities, which create a temporary increase in air emissions. A temporary increase in air emissions is defined as an increase that would only occur during a construction phase and would last for 5 years or less at any individual site. As discussed above, construction-related activities would result in short-term emissions of PM<sub>10</sub> and PM<sub>2.5</sub> from soil excavation and grading operations, and VOC, NO<sub>x</sub>, and CO emissions from the exhaust of off-road heavy-duty diesel equipment used for site preparation (e.g., excavation, grading, and clearing); paving; and other construction activities. Construction activities leading to the generation of ozone precursors and criteria air pollutant emissions would be temporary and short term in duration and would not last longer than 5 years (i.e., approximately 2 years). Thus, project-generated emissions of criteria air pollutants and precursors would not expose sensitive receptors to substantial pollutant concentrations. It is concluded that local ambient air quality impacts from construction would not be adverse.



## **Toxic Air Contaminants — Diesel Particulate Matter Exhaust Emissions**

Construction-related activities would result in short-term project-generated emissions of diesel PM from the exhaust of off-road heavy-duty diesel equipment for site preparation (e.g., excavation, grading, and clearing); paving; materials transport and handling; and other miscellaneous activities. The potential cancer risk from the inhalation of diesel PM, as discussed below, outweighs the potential noncancer health impacts (OEHHA 2003).

The dose to which receptors are exposed is the primary factor used to determine health risk (i.e., potential exposure to TACs to be compared to applicable standards). Dose is a function of the concentration of a substance or substances in the environment and the duration of exposure to the substance. Dose is positively correlated with time, meaning that a longer exposure period would result in a higher exposure level for the maximally exposed individual (MEI). Thus, the risks estimated for an MEI are higher if a fixed exposure occurs over a longer period of time. According to the Office of Environmental Health Hazard Assessment (OEHA), health risk assessments, which determine the exposure of sensitive receptors to TAC emissions, should be based on a 70-year exposure period; however, such assessments should be limited to the period/duration of activities associated with the proposed project (Salinas 2004). The project construction period would be much less than the 70-year period used for risk determination. Because the use of off-road heavy-duty diesel equipment would be temporary in combination with the highly dispersive properties of diesel PM (Zhu et al. 2002) and further reductions in exhaust emissions, and project-generated and construction-related emissions of TACs would not expose sensitive receptors to substantial emissions of TACs. Nonetheless, a measure to reduce the potential short-term exposure of sensitive receptors to diesel PM is identified in Chapter 6.

## **Naturally Occurring Asbestos and Structural Asbestos**

As discussed above in Naturally Occurring Asbestos, the project site is not located in an area that is likely to contain naturally occurring asbestos. However, certain building structures on YBI and the on- and off-ramp structures could potentially include structural asbestos that would be disturbed and emitted into the atmosphere during construction of the proposed project. As discussed in the Hazardous Waste/Materials section, the 2008 Site Management Plan has abated all known asbestos containing material (ACM) on the YBI and TI areas, including Quarters 10 and Building 267, which would be relocated as part of Alternative 2b. Therefore, the proposed project would not expose any receptors or workers to naturally occurring or structural asbestos.

## **4.2 COMPARISON OF AIR QUALITY IMPACTS BETWEEN ALTERNATIVES**

The proposed project includes three possible alternatives: No Build Alternative, Alternative 2b, and Alternative 4. The No Build Alternative would not alter the existing YBI on- and off-ramps.

The two build alternatives would include the removal of the existing on- and off-ramps and construction of new ramps that meet geometric and highway design standards and seismic requirements. The traffic study determined that VMT along the ramp junctions would be similar for all three alternatives. Therefore, operational air quality impacts associated with each alternative would vary as a result of their affect on traffic flow along the ramp junctions. The following section discussed the differences in air quality impacts between alternatives. Please see the Project Description for a detailed description of each project alternative.

### **Carbon Monoxide “Hot Spot”**

As discussed above, the proposed project would not affect any signalized intersections. Therefore, the selection of one alternative over another would not adversely affect the LOS of project intersections or the potential for a CO “hot spot.”

### **Particulate Matter “Hot Spot”**

Under the No Build Alternative, the YBI on-ramp would have insufficient capacity for future (2035) traffic volumes. However, the traffic volumes entering the SFOBB under the No Build Alternative would be slightly higher than the two build scenarios due to the unrestricted access (i.e., without metering) on the on-ramp. The two build alternatives would cause vehicles to remain on the on-ramp for longer due to the proposed metering system, which would cause more congestion and idling on the on-ramp than the No Build Alternative. Therefore, implementation of the two build alternatives is expected to be more likely to result in a PM<sub>2.5</sub> or PM<sub>10</sub> “hot spot.”

### **Mobile Source Air Toxics**

Under the No Build Alternative, the on-ramp volumes entering the SFOBB are slightly higher than the two build alternatives due to the unrestricted access (i.e., without metering). It is anticipated that the lack of metering under the No Build Alternative would allow for vehicles to travel at a higher average speed along the on-ramp to reach the SFOBB than under the metered build alternatives. As cited in the FHWA study, *A Methodology for Evaluating Mobile Source Air Toxic Emissions Among Transportation Project Alternatives*, MSAT emission factors tend to be higher with increased traffic congestion. Therefore, it is anticipated that the No Build Alternative would result in a lower amount of MSAT emissions compared with the build alternatives.

Under the two build alternatives (2b and 4), the YBI on-ramp would be metered with a one-to-one ratio (i.e., one vehicle is allowed to enter the SFOBB if one vehicle exits the SFOBB). As cited in the traffic study, the average operating speed along the ramp junction would decrease with implementation of the two build alternatives as a result of the metering system. It should be



noted that the amount of congestion on the SFOBB would be reduced with the build alternatives because only the same number of vehicles exiting the SFOBB, would be allowed to enter. Nevertheless, the two build alternatives would result in higher levels of delays and queuing and subsequent MSAT emissions than the No Build Alternative.

### **Construction Impacts**

Under the No Build Alternative, the existing ramps would remain intact and no construction emissions would be generated. Both build alternatives would involve the removal of the existing ramps and construction of new on- and off-ramps on the east side of the island.

Alternative 2b and Alternative 4 would construct the proposed westbound on-ramp at different locations, which would affect the total length of the on-ramp. Alternative 4 would require an on-ramp approximately three times longer (2,883 feet) than that of Alternative 2b (876 feet). Accordingly, Alternative 4 may require increased construction effort to complete the longer on-ramp. However, Alternative 2b would include the relocation of Quarters 10 and Building 267, which is not included in Alternative 4. In terms of air pollutant emissions, it is anticipated that construction of Alternative 2b and Alternative 4 would be comparable on an annual basis. In addition, construction of either alternative is expected to last less than 2 years, which is considered a temporary increase in air pollutant emissions.

### **Naturally Occurring Asbestos and Structural Asbestos**

As discussed above, the project site is not an area likely to contain naturally occurring asbestos. In addition, any asbestos containing material in Quarters 10 and Building 267, which would be relocated as part of Alternative 2b, has been abated in the 2008 Site Management Plan. Therefore, none of the alternatives are anticipated to cause adverse air quality impacts associated with naturally occurring or structural asbestos.

## **4.3 CUMULATIVE IMPACTS**

The analysis of project impacts to regional air quality, as performed by MTC as part of the RTP and RTIP conformity process, is a cumulative analysis. The proposed project would conform to the assumptions in the conformity analyses for the 2035 RTP and 2009 RTIP, which are long-range planning documents that include roadway projects throughout the region. These plans, among others, are used in the SIP to determine if the region would achieve attainment or maintain attainment of ambient air quality standards. Therefore, the proposed project would not result in a cumulative impact to air quality.



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## CHAPTER 5.0 – POLLUTION ABATEMENT MEASURES

Most of the construction impacts to air quality are short term in duration and, therefore, would not result in adverse or long-term conditions. Implementation of the following measures would reduce any air quality impacts resulting from construction activities:

- The construction contractor shall comply with Caltrans' Standard Specifications Section 14-9.01, "Air Pollution Control," and Section 14-9.02, "Dust Control," of Caltrans' Standard Specifications (1999).
  - Section 14-9.01, "Air Pollution Control," addresses the contractor's responsibility on many air quality concerns such as complying with air pollution control rules, regulations, ordinances, and statutes that apply to work performed under the Contract, including air pollution control rules, regulations, ordinances and statutes provided in the Government Code Section 11017 (Public Contract Code Section 10231). In addition, it is specified that material to be disposed of shall not be burned.
  - Section 14-9.02, "Dust Control," addresses the contractor's responsibility to minimize fugitive dust emissions during construction. The contractor shall prevent and alleviate dust by applying water, a dust palliative, or both under Section 14-9-01 (above); applying water under Section 17, "Watering"; applying a dust palliative under Section 18, "Dust Palliative"; and, if ordered, applying water, a dust palliative, or both to control dust caused by public traffic. This work will be paid for as extra work as specified in Section 4-1.03D, "Extra Work."
- Water or dust palliative will be applied to the site and equipment as frequently as necessary to control fugitive dust emissions.
- Soil binder will be spread on any unpaved roads used for construction purposes, and all project construction parking areas.
- Trucks will be washed off as they leave the right of way as necessary to control fugitive dust emissions.
- Construction equipment and vehicles shall be properly tuned and maintained. Low-sulfur fuel shall be used in all construction equipment as provided in California Code of Regulations Title 17, Section 93114.

- Develop a dust control plan documenting sprinkling, temporary paving, speed limits, and expedited revegetation of disturbed slopes as needed to minimize construction impacts to existing communities.
- Locate equipment and materials storage sites as far away from residential and park uses as practical. Keep construction areas clean and orderly.
- To the extent feasible, establish environmental site assessments (ESA) for sensitive air receptors within which construction activities involving extended idling of diesel equipment would be prohibited.
- Use track-out reduction measures such as gravel pads at project access points to minimize dust and mud deposits on roads affected by construction traffic.
- Cover all transported loads of soils and wet materials prior to transport, or provide adequate freeboard (space from the top of the material to the top of the truck) to reduce PM<sub>10</sub> and deposition of particulate during transportation.
- Remove dust and mud that are deposited on paved, public roads due to construction activity and traffic to decrease particulate matter.
- To the extent feasible, route and schedule construction traffic to reduce congestion and related air quality impacts caused by idling vehicles along local roads during peak travel times.
- Install mulch or plant vegetation on disturbed areas as soon as practical after grading to reduce windblown particulate in the area.



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A Guide to the

**2009 Transportation Improvement Program (TIP)**

For the Nine-County San Francisco Bay Area

May 28, 2008

MTC Resolution No. 3875



# MTC Project Staff

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Alix Bockelman  
*Director, Programming and Allocations*

Ross McKeown  
*Project Manager*

*Programming and Allocations Staff*

Craig Goldblatt

Kenny Kao

Vince Petrites

Sri Srinivasan

Peg Yamada

Transportation 2035 Plan for the San Francisco Bay Area

**FINAL**

April 2009

# CHANGE IN MOTION

TRANSPORTATION  
**2035**



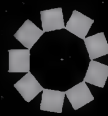


METROPOLITAN  
TRANSPORTATION  
COMMISSION

Joseph P. Bort MetroCenter  
101 Eighth Street  
Oakland, CA 94607-4700

510.817.5700 PHONE  
510.817.5769 TDD/TTY  
info@mtc.ca.gov E-MAIL  
www.mtc.ca.gov WEB

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Napa County and Cities

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U.S. Department of Transportation

Federal D. Glover  
Contra Costa County

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and Development Commission

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State Business, Transportation  
and Housing Agency

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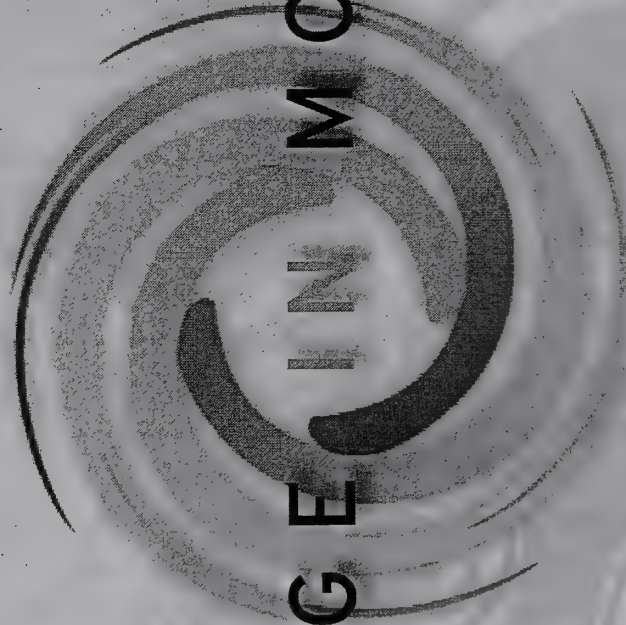


Transportation 2035 Plan for the San Francisco Bay Area

**FINAL**

April 2009

# CHANGE IN MOTION



TRANSPORTATION  
**2035**



## Financially Significant Projects in the 2009 TIP

(Total Project Cost Greater than \$200 Million)

TIP ID	County	Orig TIP	Sponsor	Project Name	Total Project Cost	Project Cost within the TIP Period
SF-070027	San Francisco	2007	SFCTA	Yerba Buena Island Ramp Improvements	\$215,450,000	\$36,500,000
ALA050017	Alameda	2005	AC Transit	Enhanced Bus – Telegraph/Int	\$203,770,193	\$43,004,300
Total					\$17,184,351,797	\$6,033,187,398

## Financially Significant Grouped Listings in the 2009 TIP

(Total Project Cost Greater than \$200 Million)

TIP ID	County	Orig TIP	Sponsor	Project Name	Total Project Cost	Project Cost within the TIP Period
VAR991005	Various	1999	Caltrans	Grouped Listing SHOPP - Bridge Preservation	\$1,977,415,000	\$370,797,000
MTC050011	Various	2005	Caltrans	Grouped Listing SHOPP - Collision Reduction	\$638,298,000	\$380,003,000
VAR991007	Various	1999	Caltrans	Grouped Listing Local - Highway Bridge Program	\$511,412,000	\$186,017,000
REG070001	Various	2007	Caltrans	Grouped Listing for SHOPP – Emergency Response	\$231,544,000	\$92,816,000
MTC050006	Various	2005	Caltrans	Group Listing SHOPP – Mobility	\$214,236,000	\$60,539,000
VAR991004	Various	1999	Caltrans	Grouped Listing SHOPP - Emergency Response (ER)	\$202,250,000	\$3,850,000
Total					\$5,020,451,000	\$1,475,299,000



# Financially Significant Projects in the 2009 TIP



Metropolitan Transportation Commission

Planning, Financing and Coordinating  
Transportation for the nine-county  
San Francisco Bay Area

Transportation Improvement Program (TIP) Mapping Project

Geographic Information Systems Unit

## Project List:

- |  |  |
|--|--|
| <p><b>1</b> San Francisco-Oakland Bay Bridge<br/>Alameda County<br/>\$5.7 Billion</p> <p><b>2</b> BART Seismic Retrofit Program<br/>Multiple Counties<br/>\$1.2 Billion</p> <p><b>3</b> BART - Warm Springs to San Jose Extension<br/>Santa Clara<br/>\$1.1 Billion</p> <p><b>4</b> Transbay Terminal/ Caltrain<br/>Downtown Extension Phase 1<br/>San Francisco<br/>\$988.2 Million</p> <p><b>5</b> US 101 Doyle Drive Replacement<br/>San Francisco<br/>\$987.3 Million</p> <p><b>6</b> Muni Third St Light Rail<br/>Phase 2 - New Central Subway<br/>San Francisco<br/>\$966.4 Million</p> <p><b>7</b> BART - Warm Springs Extension<br/>Alameda County<br/>\$889.8 Million</p> <p><b>8</b> Caltrain Electrification<br/>Multiple Counties<br/>\$629.3 Million</p> <p><b>9</b> eBART - East Contra Costa<br/>Rail Extension<br/>Contra Costa County<br/>\$487.3 Million</p> <p><b>10</b> BART Oakland Airport Connector<br/>Alameda County<br/>\$469.9 Million</p> <p><b>11</b> SR 4 East Widening from<br/>Somersville to SR 160<br/>Contra Costa County<br/>\$464.5 Million</p> | <p><b>12</b> SR 24 - Caldecott Tunnel 4th Bore<br/>Contra Costa County<br/>\$420.5 Million</p> <p><b>13</b> US 101 HOV Lanes: Marin-<br/>Sonoma Narrows<br/>Marin County<br/>\$390.9 Million</p> <p><b>14</b> Dumbarton Rail Service<br/>San Mateo County<br/>\$335.1 Million</p> <p><b>15</b> Capitol Expressway Light Rail Extension:<br/>Downtown to East Valley<br/>Alameda County<br/>\$334.3 Million</p> <p><b>16</b> BART Transbay Tube Seismic Retrofit<br/>San Francisco<br/>\$325.4 Million</p> <p><b>17</b> SR 1 Devils Slide Bypass<br/>San Mateo County<br/>\$322.9 Million</p> <p><b>18</b> I-680/Hwy 4 Interchange Reconstruction<br/>Contra Costa<br/>\$297.6 Million</p> <p><b>19</b> Golden Gate Bridge Seismic Retrofit<br/>Phase: 1 thru 3A<br/>Marin County<br/>\$272.1 Million</p> <p><b>20</b> I-80/I-680/Hwy 12 Interchange<br/>Solano County<br/>\$263 Million</p> <p><b>21</b> Yerba Buena Island Ramp Improvements<br/>San Francisco<br/>\$215.5 Million</p> <p><b>22</b> AC Transit Enhanced Bus<br/>Telegraph/International<br/>Alameda<br/>\$203.8 Million</p> |
|--|--|

The following projects are programmatic, and therefore are not shown on the map:

AC Transit Preventative Maintenance  
Alameda County  
\$250.2 Million

VTa Preventative Maintenance  
Santa Clara County  
\$313.2 Million

Note: All costs are total project costs.

### Project Type

- Transit Projects
- Road Projects

- Freeway
- Highway
- Primary road
- Open space/ park
- International airport
- Regional airport

Source: MTC (Programming & Allocations/Planning sections)  
Cartography: MTC GIS May 2008  
File: C:\Users\Public\TIP\Map\map\_data\map\_data\_2008\_10\_15\TIP\_Map\_Map\_Symbols

Scale:

1 inch equals 15 miles

0 1/2 1



# San Francisco County

(In millions of year-of-expenditure dollars)						
Reference Number	Project/Program	Total Project Cost		Discretionary Funds <sup>1</sup>		Project Notes
					Funds <sup>2</sup>	
22512	Provide capital improvements to support ferry service between Treasure Island and San Francisco	\$ 57.1	\$ 45.0	\$ 12.1	Resolution 3434 Regional Transit Expansion Program	
22982	Enhance transit programs in San Francisco that promote system connectivity and accessibility, close service gaps and expand transit service	\$ 196.1	\$ 191.1	\$ 5.0	2003 Proposition K sales tax project	
22984	Construct new/reconstruct existing wheelchair curb ramps	\$ 41.1	\$ 36.1	\$ 5.0	2003 Proposition K sales tax project	
94632	Extend Third Street Light Rail from Fourth and King streets to Bayshore Caltrain Station	\$ 649.0	\$ 649.0	\$ 0.0	2003 Proposition K sales tax and Regional Measure 2 Toll Bridge Program project	
98593	Fund the Integrated Transportation Management System (SFgo)	\$ 138.4	\$ 133.4	\$ 5.0	2003 Proposition K sales tax project	
230161	Implement a Bus Rapid Transit (BRT) project on Van Ness Avenue (includes dedicated transit lanes, signal priority and pedestrian and urban design upgrades)	\$ 87.6	\$ 87.6	\$ 0.0	Resolution 3434 Regional Transit Expansion Program	
230164	Implement a Bus Rapid Transit (BRT) project on Geary Boulevard (includes dedicated transit lanes, signal priority and pedestrian and urban design upgrades)	\$ 219.8	\$ 127.3	\$ 92.5		
230168	Improve the Great Highway between Lincoln Way and 48th Avenue (includes resurfacing roadway, installing drainage systems and constructing medians)	\$ 19.4	\$ 1.5	\$ 17.9		
230207	Implement a Bus Rapid Transit (BRT) project on the Geneva Avenue/Harney Way corridor (includes new infrastructure and rolling stock)	\$ 265.0	\$ 225.0	\$ 40.0		
230211	Extend trolley coach infrastructure into Mission Bay along 16th Street and Third Street, and implement transit signal priority along 16th Street and Fillmore Street	\$ 13.9	\$ 4.1	\$ 9.8		
230215	Extend existing trolley coach lines throughout San Francisco	\$ 5.6	\$ 1.3	\$ 4.3	2003 Proposition K sales tax project	
230364	Improve water access to San Francisco parks	\$ 4.0	\$ 4.0	\$ 0.0		
230490	Reconstruct and widen Harney Way to 8 lanes (6 mixed flow, 2 bus-only for Bus Rapid Transit service) and improve bicycle lanes and sidewalks	\$ 54.3	\$ 51.3	\$ 3.0		
230517	Improve transit and roadway connectivity between San Francisco and San Mateo counties	\$ 280.0	\$ 275.0	\$ 5.0		
230555	Reconstruct ramps on the east side of the San Francisco-Oakland Bay Bridge's Yerba Buena Island tunnel	\$ 183.0	\$ 183.0	\$ 0.0		

<sup>1</sup> Committed Funds have been reserved by law for specific uses, or allocated by MTC action prior to the development of the Transportation 2035 Plan.

<sup>2</sup> Discretionary Funds are flexible funds available to MTC (and not already programmed in Committed Funds) for assignment to projects via the Transportation 2035 Plan planning process.





**APPENDIX M**

**NOISE STUDY**



**Yerba Buena Island Ramps  
Improvement Project**

**NSR**



***Final***  
**Noise Study Report**

Yerba Buena Island Ramps Improvement Project

San Francisco, California

District 4-San Francisco-Interstate 80-PM 7.6 to 8.1

EA 04-3A640K

**January 2011**







***FINAL***

## **NOISE STUDY REPORT**

Yerba Buena Island Ramps Improvement Project

San Francisco, California

District 4-San Francisco-Interstate 80-PM 7.6 to 8.1

EA 04-3A640K

**January 2011**





# SUMMARY

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The purpose of this Noise Study Report (NSR) is to describe the existing noise environment in the project area and identify potential future traffic noise impacts associated with implementation of the Yerba Buena Island (YBI) Ramps Improvement Project (proposed project). Where traffic noise impacts would occur, this NSR states whether noise abatement would be feasible under the requirements of the California Department of Transportation (Caltrans) *Traffic Noise Analysis Protocol for New Highway Construction, Reconstruction, and Retrofit Barrier Projects* (Protocol). Specifically, for each receiver in the project area, this NSR describes existing and future predicted traffic noise levels for the build alternatives and the No-Build Alternative. This NSR also addresses potential construction noise impacts associated with the proposed project.

This NSR assesses potential noise impacts related to the proposed replacement of the existing on- and off-ramps for westbound Interstate 80 (I-80) on the San Francisco-Oakland Bay Bridge, located on the east side of YBI, between post miles 7.6 and 8.1. The project area elevation ranges from approximately 1.5 to 200 feet above mean sea level. In general, the topography in the project area slopes moderately downward from the interior of the island to the outer perimeter of the island.

The primary goals of the proposed project are to improve the safety of the on- and off-ramps to the extent physically and economically feasible, improve traffic operations to and from YBI, and comply with current Caltrans design standards. Under the proposed project, the standard deceleration length for the off-ramp would be provided, and the acceleration/merging length for the on-ramp would be improved. In addition, implementing the proposed project would improve traffic operations to and from YBI.

A limited range of alternatives has been identified for the proposed project. The alternatives present minor variations in cost, impact footprint, and operational characteristics (i.e., lane configurations, bike lane accommodations, and width). The alternatives considered in this NSR are Alternative 2B, Alternative 4, and the No-Build Alternative. Under the No-Build Alternative, the existing on- and off-ramps would remain in place, and no improvements would be made. Alternative 2B would involve removing the existing on- and off-ramps for westbound I-80 on the east side of YBI, constructing a loop on-ramp from Macalla Road, and constructing an off-ramp to Macalla Road. Alternative 4 would involve removing the existing on- and off-ramps for westbound I-80 on the east side of YBI, constructing an on-ramp from South Gate Road, and constructing an off-ramp to Macalla Road.

Adjacent land uses include residential and a limited amount of commercial development and a U.S. Coast Guard station, intermixed with undeveloped hillsides. The U.S. Coast Guard station includes a separate area with varying land uses, including residential, commercial, office, and

industrial development. Commercial development is scattered to the north of the project area. Additional residential, commercial, and industrial development is located west of YBI on Treasure Island.

Potential noise impacts were assessed by investigating the existing traffic noise conditions in the project area, identifying noise-sensitive locations, and predicting future traffic noise levels with and without the alternatives. The noise receivers analyzed in the project area are located throughout YBI. Most of the category B receivers in the project area are residential, single-family, and multiple-family units. Seventeen receiver points, representing three single-family residential units, 20 multiple-family residential units, 12 commercial/governmental units, one recreational area, and one driveway, were used.

Noise levels were measured at select receivers in the project area to identify existing background noise levels and validate the noise model. Loudest hour noise levels were modeled and indicate that the existing traffic noise levels approach or exceed the noise abatement criteria (NAC) at one category B receiver (R-3). The category B receiver represents 12 multiple-family residential units. Additionally, two category C receivers representing seven commercial/governmental units (R-2, R-4, and R-16) are exposed to existing noise levels that approach or exceed the NAC. 4

Under the No-Build Alternative, predicted changes in traffic noise levels over existing conditions would range from -4 to 2 A-weighted decibels (dBA) equivalent sound level ( $L_{eq}$ ). Noise levels would approach or exceed the NAC at one category B receiver (R-3) representing 12 multiple-family residential units. Predicted noise levels at all other category B receivers would range from 41 to 65 dBA  $L_{eq}$ . Noise levels also would approach or exceed the NAC at one category C receiver representing one governmental unit (R-16). Predicted noise levels at all other category C receivers would range from 61 to 69 dBA  $L_{eq}$ .

Under Alternative 2B, noise level changes would range from -4 to 2 dBA over existing conditions and would not change over noise levels under the No-Build Alternative. Under this build alternative, noise levels would approach or exceed the NAC at one category B receiver (R-3) representing 12 multiple-family residential units. Predicted noise levels at all other category B receivers under this build alternative would range from 41 to 65 dBA  $L_{eq}$ . Noise levels also would approach or exceed the NAC at one category C receiver representing one governmental unit (R-16). Predicted noise levels at all other category C receivers under this build alternative would range from 61 to 69 dBA  $L_{eq}$ .

Under Alternative 4, noise level changes would range from -4 to 2 dBA over existing conditions and would not change over noise levels under the No-Build Alternative. Under this build alternative, noise levels would approach or exceed the NAC at one category B receiver (R-3) representing 12 multiple-family residential units. Predicted noise levels at all other category B receivers under either build alternative would range from 41 to 65 dBA  $L_{eq}$ . Noise levels also

would approach or exceed the NAC at one category C receiver representing one governmental unit (R-16). Predicted noise levels at all other category C receivers under this build alternative would range from 61 to 69 dBA  $L_{eq}$ .

Although a traffic noise impact has been identified at one category B receiver, no area of frequent human use is associated with this receiver; therefore, noise abatement was not considered feasible, and no soundwalls are required.

Construction noise related to implementing the proposed project is anticipated to be typical of that for road construction. Some pavement breaking would be required; however, these activities would be temporary. Construction equipment noise may be audible at local receivers above the normal traffic noise. Night work would be required to maintain roadway operation for activities that would cross travel lanes. Nighttime construction noise would result in noise levels approximately 2 dBA above the lowest measured ambient hourly noise level; however, these noise level increases would be temporary and would not represent a substantial increase in noise levels at local receivers. To minimize construction-related noise to the extent practical, Caltrans would implement noise control measures as part of standard contract requirements.



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# TABLE OF CONTENTS

Section	Page
SUMMARY .....	S-1
CHAPTER 1 INTRODUCTION .....	1
1.1 Purpose of the Noise Study Report.....	1
1.2 Project Purpose and Need .....	1
CHAPTER 2 PROJECT DESCRIPTION .....	3
2.1 Project Alternatives .....	3
2.1.1 Alternative 2B .....	3
2.1.2 Alternative 4.....	7
2.1.3 No-Build Alternative.....	9
CHAPTER 3 FUNDAMENTALS OF TRAFFIC NOISE.....	10
3.1 Sound, Noise, and Acoustics .....	10
3.2 Frequency .....	10
3.3 Sound Pressure Levels and Decibels.....	10
3.4 Addition of Decibels.....	11
3.5 A-Weighted Decibels.....	11
3.6 Human Response to Changes in Noise Levels.....	12
3.7 Noise Descriptors .....	13
3.8 Sound Propagation.....	13
3.8.1 Geometric Spreading.....	14
3.8.2 Ground Absorption.....	14
3.8.3 Atmospheric Effects.....	14
3.8.4 Shielding by Natural or Human-Made Features .....	14
CHAPTER 4 FEDERAL REGULATIONS AND STATE POLICIES .....	15
4.1 Federal Regulations .....	15
4.1.1 23 CFR 772 .....	15
4.2 State Regulations and Policies.....	16
4.2.1 Traffic Noise Analysis Protocol for New Highway Construction and Reconstruction Projects.....	16
4.2.2 Section 216 of the California Streets and Highways Code .....	16
CHAPTER 5 STUDY METHODS AND PROCEDURES .....	19
5.1 Selection of Receivers and Measurement Sites.....	19
5.2 Field Measurement Procedures .....	20
5.2.1 Instrumentation and Setup.....	23
5.2.2 Meteorology .....	23
5.2.3 Data Reduction.....	23

# TABLE OF CONTENTS

<u>Section</u>	<u>Page</u>
5.3 Traffic Noise Prediction .....	24
5.4 Traffic Parameters .....	24
CHAPTER 6 EXISTING NOISE ENVIRONMENT .....	27
6.1 Project Area.....	27
6.2 Noise Receivers .....	27
6.3 Existing Noise Level Measurements .....	28
6.4 Predicted Existing Noise Levels and Calibration .....	32
CHAPTER 7 FUTURE NOISE ENVIRONMENT, IMPACTS, AND CONSIDERED ABATEMENT .....	35
7.1 Predicted Noise Levels – Site Geometry and Traffic.....	35
7.2 Traffic Noise Impacts.....	35
7.3 Noise Abatement.....	36
7.4 Feasibility of Noise Abatement.....	45
7.5 Reasonable Noise Abatement.....	45
7.6 Areas Where Abatement Is Not Feasible .....	45
CHAPTER 8 CONSTRUCTION NOISE .....	47
8.1 Applicable Standards .....	47
8.1.1 California Department of Transportation.....	47
8.2 Impacts.....	47
8.2.1 Construction Activities .....	47
8.3 Construction Noise Abatement.....	49
CHAPTER 9 REFERENCES.....	51
CHAPTER 10 LIST OF PREPARERS.....	53

## APPENDICES

- A Noise Measurements
- B Traffic Data Used in Noise Modeling
- C Noise Level Adjustments and K-Factors
- D FHWA TNM 2.5 Input and Output Data (See CD)



## LIST OF FIGURES

Figure	Page
1 Regional Map .....	4
2 Vicinity Map .....	5
3 Alternative 2B Site Plan.....	6
4 Alternative 4 Site Plan .....	8
5 Noise Measurement and Receiver Locations.....	21
6 Alternative 2B and Receiver Locations .....	39
7 Alternative 4 and Receiver Locations .....	41

## LIST OF TABLES

Table	Page
Table 1. Typical A-Weighted Noise Levels .....	12
Table 2. Activity Categories and Noise Abatement Criteria .....	16
Table 3. Traffic Volume Mix Used in TNM 2.5 .....	25
Table 4. Summary of LT-1, March 30, 2009 .....	29
Table 5. Summary of LT-2, March 30, 2009 .....	29
Table 6. Summary of LT-3, March 30, 2009 .....	30
Table 7. Summary of LT-4, April 2, 2009 .....	30
Table 8. Summary of LT-5, April 6, 2009 .....	31
Table 9. Short-Term Noise Measurement Summary .....	32
Table 10. Loudest Hour Noise Level Model Comparison .....	33
Table 11. Predicted Noise Levels .....	43

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## LIST OF ABBREVIATED TERMS

Caltrans	California Department of Transportation
CEQA	California Environmental Quality Act
CFR	Code of Federal Regulations
CNEL	community noise equivalent level
dB	decibel(s)
dBA	A-weighted decibel(s)
FHWA	Federal Highway Administration
HOV	high-occupancy vehicle
Hz	hertz
I-80	Interstate 80
L <sub>dn</sub>	day-night level
LD820	Larson Davis Laboratories Model 820
LD824	Larson-Davis Laboratories Model 824
L <sub>eq</sub>	equivalent sound level
L <sub>eq(h)</sub>	equivalent sound level over 1 hour
L <sub>max</sub>	maximum sound level
LOS	level of service
LT	long term
L <sub>xx</sub>	percentile-exceeded sound level
mPa	micro-Pascal(s)
mph	miles per hour
NAC	noise abatement criteria
NEPA	National Environmental Policy Act
NSR	Noise Study Report
PM	post mile
Protocol	Caltrans's 2006 Traffic Noise Analysis Protocol for New Highway Construction, Reconstruction, and Retrofit Barrier Projects
R-	Receiver-
SFOBB	San Francisco-Oakland Bay Bridge
SLM	sound level meter
SN	serial number
SPL	sound pressure level
ST	short term
TeNS	Caltrans's 1998 Technical Noise Supplement
TNM 2.5	FHWA Traffic Noise Model, version 2.5
USCG	U.S. Coast Guard
YBI	Yerba Buena Island



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# CHAPTER 1 INTRODUCTION

---

## 1.1 Purpose of the Noise Study Report

The purpose of this Noise Study Report (NSR) is to evaluate noise impacts and abatement under the requirements of Title 23, Part 772 of the Code of Federal Regulations (23 CFR 772), 'Procedures for Abatement of Highway Traffic Noise.' 23 CFR 772 provides procedures for preparing operational and construction noise studies and evaluating noise abatement considered for federal and federal-aid highway projects. According to 23 CFR 772.3, all highway projects that are developed in conformance with this regulation are deemed to be in conformance with Federal Highway Administration (FHWA) noise standards.

*The Traffic Noise Analysis Protocol for New Highway Construction, Reconstruction, and Retrofit Barrier Projects* (Protocol) (Caltrans 2006) provides the California Department of Transportation (Caltrans) policy for implementing 23 CFR 772 in California. The Protocol outlines the requirements for preparing NSRs. Noise impacts associated with this project under the National Environmental Policy Act (NEPA) and the California Environmental Quality Act (CEQA) are evaluated in the Yerba Buena Island (YBI) Ramps Improvement Project Environmental Assessment/Environmental Impact Report.

## 1.2 Project Purpose and Need

The proposed project is needed to increase and improve safety of the on- and off-ramps, improve mobility, and meet current Caltrans design standards along the YBI San Francisco-Oakland Bay Bridge (SFOBB) stretch of westbound Interstate 80 (I-80). The SFOBB stretch of I-80 is a primary transportation corridor between the city of San Francisco and the city of Oakland. The SFOBB is considered a lifeline structure and is a critical link between San Francisco and the East Bay. It also provides the only vehicle access to YBI, the active U.S. Coast Guard (USCG) facilities located on the south side of the island, and Treasure Island. West and east of YBI, the SFOBB has five general-purpose lanes in each direction traveling to San Francisco and Oakland.

The current configuration of on- and off-ramps for the SFOBB on YBI does not comply with Caltrans guidelines for vehicle safety and seismic stability. Currently, the YBI SFOBB stretch of westbound I-80 does not meet the minimum design standards established by the Highway Design Manual, dated September 2006, for deceleration length for the off-ramp and acceleration/merging length for the on-ramp. Thus, the primary purpose of the proposed project is to improve the safety of the on- and off-ramps to the extent physically and economically feasible and to reconstruct the on- and off-ramps to comply with current Caltrans design standards by providing standard deceleration length for the off-ramp and improved acceleration/merging length for the on-ramp, while minimizing environmental and community

impacts for the planning design year of 2014. The completion of the proposed project would accomplish the following objectives:

- improve traffic safety for drivers using the westbound on- and off-ramps,
- improve geometric design of the westbound on- and off-ramps on the east side of YBI to and from I-80, and
- improve traffic operations levels of service on the westbound on- and off-ramps.



## CHAPTER 2 PROJECT DESCRIPTION

---

The proposed project is located on YBI, in the San Francisco Bay, approximately halfway between Oakland and San Francisco (Figures 1 and 2). The project site is located between post mile (PM) 7.6 and 8.1, beginning at the eastern mouth of the YBI tunnel and ending at the east side of the transition structure portion of the new SFOBB. The transition structure is located between PM 7.9 and 8.1, between the YBI tunnel and the SFOBB self-anchored suspension span. The project area elevation ranges from approximately 1 to 203 feet above mean sea level. In general, the topography in the project area slopes moderately downward from the interior of the island to the outer perimeter of the island.

The eastern mouth of the YBI tunnel (the western boundary of the project site) can be found at approximately 37°48'36' North and 122°21'54' West in the Oakland West and San Francisco North U.S. Geological Survey 7.5-minute quadrangle maps. Adjacent land uses include residential and a limited amount of commercial development and a USCG station, intermixed with undeveloped hillsides. The USCG station includes a separate area with varying land uses, including residential, commercial, office, and industrial development. Commercial development is scattered to the north of the project area. Additional residential, commercial, and industrial development is located west of YBI on Treasure Island.

### 2.1 Project Alternatives

A limited range of alternatives has been identified for the proposed project. The alternatives present minor variations in cost, impact footprint, and operational characteristics (i.e., lane configurations, bike lane accommodations, and width). The alternatives considered in this NSR are Alternative 2B, Alternative 4, and the No-Build Alternative. These alternatives are described in the following sections.

#### 2.1.1 Alternative 2B

Alternative 2b would involve removing the existing on- and off-ramps for westbound I-80 on the east side of YBI, constructing a loop on-ramp from Macalla Road, and constructing an off-ramp to Macalla Road (Figure 3). Under this alternative, two of the existing six on- and off-ramps at the I-80/YBI interchange would be reconstructed. The proposed on- and off-ramps would provide a single traffic lane with standard shoulder widths and would have the following features:

- The on-ramp on the east side of YBI would begin at a T intersection at Macalla Road, loop right with a tight radius, and connect with the north side of the SFOBB. The length of the ramp would be approximately 876 feet. The ramp would have two traffic lanes that merge into one as it connects to the SFOBB. One lane would be a high-occupancy vehicle (HOV) lane and the other a mixed-flow lane.



Not To Scale

**Figure 1**  
**Regional Map**

# Yerba Buena Island Ramps Improvement Project Noise Study Report

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Portion of USGS topographic quadrangles:  
Oakland West and San Francisco North

Project Location

Transition Structure Portion of SFOBB



Not To Scale

**Figure 2**  
**Vicinity Map**





**Alternative 2b Proposed Ramps**

- Proposed West Bound Off-Ramp
- Proposed West Bound On-Ramp
- Proposed Macalla Road Improvements

**Separate Project Currently Under Construction**

- San Francisco-Oakland Bay Bridge East Span Seismic Safety Project
- Transition Structure Portion of SFOBB

Source: Nima/USGS 2004; DMJM Harris, EDAW 5/09



Not To Scale

**Figure 3**  
**Alternative 2B Site Plan**

**Yerba Buena Island Interchange Project**

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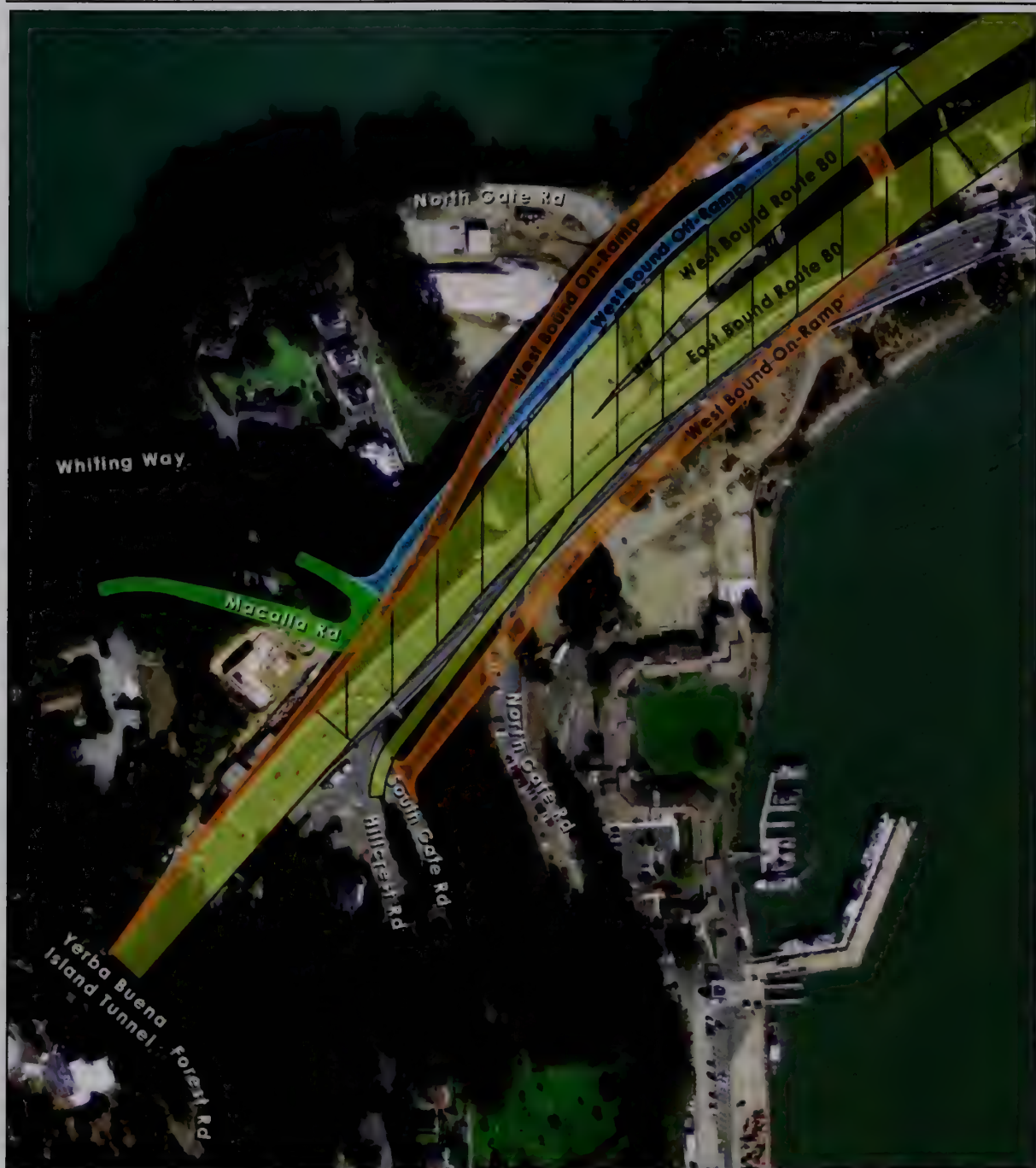
- The off-ramp on the east side of YBI would diverge from the new SFOBB transition structure between bents W3 and W4 curving around the Nimitz House and terminate at a T intersection at Macalla Road. The length of this ramp would be approximately 1,115 feet. A stop sign is proposed at the ramp terminus.
- Macalla Road would be widened for approximately 660 feet adjacent to the terminus of the on- and off-ramps. The existing roadway is approximately 20 feet wide near the ramp terminus. The roadway widening is required to accommodate a 12-foot-wide multi-use pedestrian/bike path and two 12-foot-wide lanes in the Caltrans right-of-way. A retaining wall would be constructed adjacent to Macalla Road to provide the required width. The height of the retaining wall would vary from 4 to 16 feet and would retain the hillside above Macalla Road. The stairway adjacent to the Caltrans substation would be relocated to the west side of the building to make room for the new retaining wall. The roadway width would vary around the curve at South Gate Road to provide proper width for truck turning movements.
- The on- and off-ramps would terminate at Macalla Road where Quarters 10 is currently located. Quarters 10 would be relocated before construction of the ramps. The relocation site for these buildings would be on YBI and would be determined under the Section 106 mitigation development process.

#### **2.1.2 Alternative 4**

Alternative 4 would involve removing the existing on- and off-ramps for westbound I-80 on the east side of YBI, constructing an on-ramp from South Gate Road, and constructing an off-ramp to Macalla Road (Figure 4). Under this alternative, two of the existing six on- and off-ramps at the I-80/YBI interchange would be reconstructed. The proposed on- and off-ramps would provide a single traffic lane with standard shoulder widths and would have the following features:

- The on-ramp on the east side of YBI would begin at South Gate Road; proceed east, paralleling the eastbound on-ramp; loop under the new SFOBB transition structure near its eastern end to provide adequate merging distances; and cross over the off-ramp along the north side of the SFOBB. The length of this ramp would be approximately 2,883 feet. An HOV lane would not be provided.
- The off-ramp on the east side of YBI would diverge from the new SFOBB transition structure between bents W2 and W3, parallel the transition structure, cross under the on-ramp, and terminate at a T intersection at North Gate Road. The length of this ramp would be approximately 1,168 feet. A stop sign is proposed at the ramp terminus.





#### Alternative 4 Proposed Ramps

- Proposed West Bound Off-Ramp
- Proposed West Bound On-Ramp
- Proposed Macalla Road Improvements

#### Separate Project Currently Under Construction

- San Francisco-Oakland Bay Bridge East Span Seismic Safety Project
- Transition Structure Portion of SFOBB

Source: Nima/USGS 2004; DMJM Harris, EDAW 5/09



Not To Scale

**Figure 4**  
**Alternative 4 Site Plan**

#### Yerba Buena Island Ramps Improvement Project Noise Study Report

P:\2008\08080090 Yerba Buena Island Interchange\5.0 Graphics (Non-CAD)\5.7 Report Graphics\Figures\Jason project Appendices\Figure 4 alt 4 new.ai (dbrady) 8/3/09



- Macalla Road would be widened for approximately 660 feet adjacent to the terminus of the on- and off-ramps. The existing roadway is approximately 20 feet wide near the ramp terminus. The roadway widening is required to accommodate a 12-foot-wide multi-use pedestrian/bike path and two 12-foot-wide lanes in the Caltrans right-of-way. A retaining wall would be constructed adjacent to Macalla Road to provide the required width. The height of the retaining wall would vary from 4 to 16 feet and would retain the hillside above Macalla Road. The roadway width would vary around the curve at South Gate Road to provide proper width for truck turning movements.
- No buildings would be relocated under Alternative 4.

### **2.1.3 No-Build Alternative**

Environmental review must consider the effects of not implementing the proposed project. The No-Build Alternative is a base point from which to evaluate the impacts of the proposed build alternatives. It would not provide solutions to the existing roadway deficiencies. With the exception of the on- and off-ramps for eastbound I-80, which are part of the SFOBB East Span Seismic Safety Project, the No-Build Alternative assumes that the existing on- and off- ramps for westbound I-80 would remain in place and that no improvements would be made.

# CHAPTER 3    FUNDAMENTALS OF TRAFFIC NOISE

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The following is a brief discussion of fundamental traffic noise concepts. For a detailed discussion, please refer to Caltrans' Technical Noise Supplement (TeNS) (Caltrans 1998), a technical supplement to the Protocol, that is available on the Caltrans Web site ([http://www.dot.ca.gov/hq/env/noise/pub/tens\\_complete.pdf](http://www.dot.ca.gov/hq/env/noise/pub/tens_complete.pdf)).

## **3.1    Sound, Noise, and Acoustics**

Sound can be described as the mechanical energy of a vibrating object transmitted by pressure waves through a liquid or gaseous medium (e.g., air) to a hearing organ, such as a human ear. Noise is defined as loud, unexpected, or annoying sound.

In the science of acoustics, the fundamental model consists of a sound (or noise) source, a receiver, and the propagation path between the two. The loudness of the noise source and obstructions or atmospheric factors affecting the propagation path to the receiver determines the sound level and characteristics of the noise perceived by the receiver. The field of acoustics deals primarily with the propagation and control of sound.

## **3.2    Frequency**

Continuous sound can be described by frequency (pitch) and amplitude (loudness). A low-frequency sound is perceived as low in pitch. Frequency is expressed in terms of cycles per second, or Hertz (Hz) (e.g., a frequency of 250 cycles per second is referred to as 250 Hz). High frequencies are sometimes more conveniently expressed in kilohertz, or thousands of Hertz. The audible frequency range for humans is generally between 20 Hz and 20,000 Hz.

## **3.3    Sound Pressure Levels and Decibels**

The amplitude of pressure waves generated by a sound source determines the loudness of that source. Sound pressure amplitude is measured in micro-Pascals (mPa). One mPa is approximately one hundred billionth (0.0000000001) of normal atmospheric pressure. Sound pressure amplitudes for different kinds of noise environments can range from less than 100 to 100,000,000 mPa. Because of this huge range of values, sound is rarely expressed in terms of mPa. Instead, a logarithmic scale is used to describe sound pressure level (SPL) in terms of decibels (dB). The threshold of hearing for young people is about 0 dB, which corresponds to 20 mPa.

### **3.4 Addition of Decibels**

Because decibels are logarithmic units, SPL cannot be added or subtracted through ordinary arithmetic. Under the decibel scale, a doubling of sound energy corresponds to a 3-dB increase. In other words, when two identical sources are each producing sound of the same loudness, the resulting sound level at a given distance would be 3 dB higher than one source under the same conditions. For example, if one automobile produces an SPL of 70 dB when it passes an observer, two cars passing simultaneously would not produce 140 dB—rather, they would combine to produce 73 dB. Under the decibel scale, three sources of equal loudness together produce a sound level 5 dB louder than one source.

### **3.5 A-Weighted Decibels**

The decibel scale alone does not adequately characterize how humans perceive noise. The dominant frequencies of a sound have a substantial effect on the human response to that sound. Although the intensity (energy per unit area) of the sound is a purely physical quantity, the loudness or human response is determined by the characteristics of the human ear.

Human hearing is limited in the range of audible frequencies as well as in the way it perceives the SPL in that range. In general, people are most sensitive to the frequency range of 1,000–8,000 Hz, and perceive sounds within that range better than sounds of the same amplitude in higher or lower frequencies. To approximate the response of the human ear, sound levels of individual frequency bands are weighted, depending on the human sensitivity to those frequencies. Then, an ‘A-weighted’ sound level (expressed in units of dBA) can be computed based on this information.

The A-weighting network approximates the frequency response of the average young ear when listening to most ordinary sounds. When people make judgments of the relative loudness or annoyance of a sound, their judgments correlate well with the A-scale sound levels of those sounds. Other weighting networks have been devised to address high noise levels or other special problems (e.g., B-, C-, and D-scales), but these scales are rarely used in conjunction with highway-traffic noise. Noise levels for traffic noise reports are typically reported in terms of A-weighted decibels or dBA. Table 1 describes typical A-weighted noise levels for various noise sources.



**Table 1. Typical A-Weighted Noise Levels**

Common Outdoor Activities	Noise Level (dBA)	Common Indoor Activities
	— 110 —	Rock band
Jet fly-over at 1,000 feet	— 100 —	
Gas lawn mower at 3 feet	— 90 —	
Diesel truck at 50 feet at 50 miles per hour	— 80 —	Food blender at 3 feet Garbage disposal at 3 feet
Noisy urban area, daytime	— 70 —	Vacuum cleaner at 10 feet Normal speech at 3 feet
Gas lawn mower, 100 feet	— 60 —	
Commercial area		Large business office Dishwasher next room
Heavy traffic at 300 feet	— 50 —	
Quiet urban daytime	— 40 —	Theater, large conference room (background)
Quiet urban nighttime	— 30 —	Library
Quiet suburban nighttime	— 20 —	Bedroom at night, concert
Quiet rural nighttime	— 10 —	Broadcast/recording studio
Lowest threshold of human hearing	— 0 —	Lowest threshold of human hearing

Source: Caltrans 1998

### 3.6 Human Response to Changes in Noise Levels

As discussed above, the doubling of sound energy results in a 3-dB increase in sound.

However, given a sound level change measured with precise instrumentation, the subjective human perception of a doubling of loudness will usually be different from what is measured.

Under controlled conditions in an acoustical laboratory, the trained, healthy human ear is able to discern 1-dB changes in sound levels when exposed to steady, single-frequency ('pure-tone') signals in the midfrequency (1,000–8,000 Hz) range. In typical noisy environments, changes in noise of 1–2 dB are generally not perceptible. However, it is widely accepted that people are able to begin to detect sound level increases of 3 dB in typical noisy environments. Further, a

5-dB increase is generally perceived as a distinctly noticeable increase, and a 10-dB increase is generally perceived as a doubling of loudness. Therefore, a doubling of sound energy (e.g., doubling the volume of traffic on a highway) that would result in a 3-dB increase in sound would generally be perceived as barely detectable.

### 3.7 Noise Descriptors

Noise in our daily environment fluctuates over time. Some fluctuations are minor, but some are substantial. Some noise levels occur in regular patterns, but others are random. Some noise levels fluctuate rapidly, but others fluctuate slowly. Some noise levels vary widely, but others are relatively constant. Various noise descriptors have been developed to describe time-varying noise levels. The following are the noise descriptors most commonly used in traffic noise analysis.

**Equivalent Sound Level ( $L_{eq}$ ):**  $L_{eq}$  represents an average of the sound energy occurring over a specified period. In effect,  $L_{eq}$  is the steady-state sound level containing the same acoustical energy as the time-varying sound that actually occurs during the same period. The 1-hour A-weighted equivalent sound level ( $L_{eq[h]}$ ) is the energy average of A-weighted sound levels occurring during a 1-hour period and is the basis for noise abatement criteria (NAC) used by Caltrans and FHWA.

**Percentile-Exceeded Sound Level ( $L_{xx}$ ):**  $L_{xx}$  represents the sound level exceeded for a given percentage of a specified period (e.g.,  $L_{10}$  is the sound level exceeded 10 percent of the time, and  $L_{90}$  is the sound level exceeded 90 percent of the time).

**Maximum Sound Level ( $L_{max}$ ):**  $L_{max}$  is the highest instantaneous sound level measured during a specified period.

**Day-Night Level ( $L_{dn}$ ):**  $L_{dn}$  is the energy average of A-weighted sound levels occurring over a 24-hour period, with a 10-dB penalty applied to A-weighted sound levels occurring during nighttime hours between 10 p.m. and 7 a.m.

**Community Noise Equivalent Level (CNEL):** Similar to  $L_{dn}$ , CNEL is the energy average of the A-weighted sound levels occurring over a 24-hour period, with a 10-dB penalty applied to A-weighted sound levels occurring during the nighttime hours between 10 p.m. and 7 a.m. and a 5-dB penalty applied to the A-weighted sound levels occurring during evening hours between 7 p.m. and 10 p.m.

### 3.8 Sound Propagation

When sound propagates over a distance, it changes in level and frequency content. The manner in which noise reduces with distance depends on the following factors.

### **3.8.1 Geometric Spreading**

Sound from a localized source (i.e., a point source) propagates uniformly outward in a spherical pattern. The sound level attenuates (or decreases) at a rate of 6 dBA for each doubling of distance from a point source. Highways consist of several localized noise sources on a defined path and hence can be treated as a line source, which approximates the effect of several point sources. Noise from a line source propagates outward in a cylindrical pattern, often referred to as cylindrical spreading. Sound levels attenuate at a rate of 3 dBA for each doubling of distance from a line source.

### **3.8.2 Ground Absorption**

The propagation path of noise from a highway to a receiver is usually very close to the ground. Noise attenuation from ground absorption and reflective-wave canceling adds to the attenuation associated with geometric spreading. Traditionally, the excess attenuation has also been expressed in terms of attenuation per doubling of distance. This approximation is usually sufficiently accurate for distances of less than 200 feet. For acoustically hard sites (i.e., sites with a reflective surface between the source and the receiver, such as a parking lot or body of water), no excess ground attenuation is assumed. For acoustically absorptive or soft sites (i.e., those sites with an absorptive ground surface between the source and the receiver, such as soft dirt, grass, or scattered bushes and trees), an excess ground-attenuation value of 1.5 dBA per doubling of distance is normally assumed. When added to the cylindrical spreading, the excess ground attenuation results in an overall drop-off rate of 4.5 dBA per doubling of distance.

### **3.8.3 Atmospheric Effects**

Receivers located downwind from a source can be exposed to increased noise levels relative to calm conditions, whereas locations upwind can have lowered noise levels. Sound levels can be increased at large distances (e.g., more than 500 feet) from the highway because of atmospheric temperature inversion (i.e., increasing temperature with elevation). Other factors such as air temperature, humidity, and turbulence can also have significant effects.

### **3.8.4 Shielding by Natural or Human-Made Features**

A large object or barrier in the path between a noise source and a receiver can substantially attenuate noise levels at the receiver. The amount of attenuation provided by shielding depends on the size of the object and the frequency content of the noise source. Natural terrain features (e.g., hills and dense woods) and human-made features (e.g., buildings and walls) can substantially reduce noise levels. Walls are often constructed between a source and a receiver specifically to reduce noise. A barrier that breaks the line of sight between a source and a receiver will typically result in at least 5 dB of noise reduction. Taller barriers provide increased noise reduction. Vegetation between the highway and receiver is rarely effective in reducing noise because it does not create a solid barrier.



# CHAPTER 4    FEDERAL REGULATIONS AND STATE POLICIES

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This NSR focuses on the requirements of 23 CFR 772, as discussed below.

## 4.1    Federal Regulations

### 4.1.1    23 CFR 772

23 CFR 772 provides procedures for preparing operational and construction noise studies and evaluating noise abatement considered for federal and federal-aid highway projects. Under 23 CFR 772.7, projects are categorized as Type I or Type II projects. FHWA defines a Type I project as a proposed federal or federal-aid highway project for the construction of a highway on a new location or as the physical alteration of an existing highway that significantly changes either the horizontal or vertical alignment or increases the number of through-traffic lanes. A Type II project is a noise barrier retrofit project that involves no changes to highway capacity or alignment.

Type I projects include those that create a completely new noise source, as well as those that increase the volume or speed of traffic or move the traffic closer to a receiver. Type I projects include the addition of an interchange, ramp, auxiliary lane, or truck-climbing lane to an existing highway or the widening of an existing ramp by a full lane width for its entire length. Projects unrelated to increased noise levels, such as striping, lighting, signing, and landscaping projects, are not considered Type I projects.

Under 23 CFR 772.11, noise abatement must be considered for Type I projects if the project is predicted to result in a traffic noise impact. In such cases, 23 CFR 772 requires that the project sponsor 'consider' noise abatement before adoption of the final NEPA document. This process involves identification of noise abatement measures that are reasonable, feasible, and likely to be incorporated into the project and identification of noise impacts for which no apparent solution is available.

Traffic noise impacts, as defined in 23 CFR 772.5, occur when the predicted noise level in the design year approaches or exceeds the NAC specified in 23 CFR 772, or a predicted noise level substantially exceeds the existing noise level (a 'substantial' noise increase). 23 CFR 772 does not specifically define the terms 'substantial increase' or 'approach'; these criteria are defined in the Protocol, as described below.

Table 2 summarizes NAC corresponding to various land use activity categories. Activity categories and related traffic noise impacts are determined based on the actual land use in a given area.

**Table 2. Activity Categories and Noise Abatement Criteria**

Activity Category	NAC, Hourly A-Weighted Noise Level (dBA- $L_{eq}[h]$ )	Description of Activities
A	57 Exterior	Lands on which serenity and quiet are of extraordinary significance and serve an important public need and where the preservation of those qualities is essential if the area is to continue to serve its intended purpose
B	67 Exterior	Picnic areas, recreation areas, playgrounds, active sport areas, parks, residences, motels, hotels, schools, churches, libraries, and hospitals
C	72 Exterior	Developed lands, properties, or activities not included in categories A or B above
D	--	Undeveloped lands
E	52 Interior	Residences, motels, hotels, public meeting rooms, schools, churches, libraries, hospitals, and auditoriums
Source: 23 CFR 772		

In identifying noise impacts, primary consideration is given to exterior areas of frequent human use. In situations where there are no exterior activities, or where the exterior activities are far from the roadway or physically shielded in a manner that prevents an impact on exterior activities, the interior criterion (category E) is used as the basis for determining a noise impact.

## 4.2 State Regulations and Policies

### 4.2.1 Traffic Noise Analysis Protocol for New Highway Construction and Reconstruction Projects

The Protocol specifies the policies, procedures, and practices to be used by agencies that sponsor new construction or reconstruction of federal or federal-aid highway projects. The NAC specified in the Protocol are the same as those specified in 23 CFR 772. The Protocol defines a noise increase as substantial when the predicted noise levels with project implementation exceed existing noise levels by 12 dBA. The Protocol also states that a sound level is considered to approach an NAC level when the sound level is within 1 dB of the NAC identified in 23 CFR 772 (e.g., 66 dBA is considered to approach the NAC of 67 dBA, but 65 dBA is not) (Caltrans 2006).

The TeNS to the Protocol provides detailed technical guidance for the evaluation of highway traffic noise. This includes field measurement methods, noise modeling methods, and report preparation guidance (Caltrans 1998).

### 4.2.2 Section 216 of the California Streets and Highways Code

Section 216 of the California Streets and Highways Code relates to the noise effects of a proposed freeway project on public and private elementary and secondary schools. Under this

code, a noise impact occurs if, as a result of a proposed freeway project, noise levels exceed 52 dBA- $L_{eq(h)}$  in the interior of public or private elementary or secondary classrooms, libraries, multipurpose rooms, or spaces. This requirement does not replace the 'approach or exceed' NAC criterion for FHWA Activity Category E for classroom interiors, but it is a requirement that must be addressed in addition to the requirements of 23 CFR 772.

If implementing a project results in a noise impact under this code, noise abatement must be provided to reduce classroom noise to a level that is at or below 52 dBA- $L_{eq(h)}$ . If the noise levels generated from freeway and nonfreeway sources exceed 52 dBA- $L_{eq(h)}$  prior to the construction of the proposed freeway project, then noise abatement must be provided to reduce the noise to the level that existed prior to construction of the project.



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# CHAPTER 5 STUDY METHODS AND PROCEDURES

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## 5.1 Selection of Receivers and Measurement Sites

Preliminary selection of receivers for modeling and measurement was made based on the distance to the project limits, aerial photographs of the project area, and an initial field visit. Receiver locations were then refined based on the results of a field visit, maps, and photographic data. Modeled receiver placement focused on areas of frequent human use associated with residential or recreational units. Measurement points, identified as short-term (ST) 1 through ST-5 (Figure 5), were used to calibrate the FHWA Traffic Noise Model, version 2.5 (TNM 2.5) relative to the distribution of traffic noise. With the exception of ST-4, all measurement points are also represent areas of frequent human use. ST-4 does not represent an area of frequent human use; thus, traffic noise impacts are not assessed at this location. ST-1 is modeled as R-1, ST-2 is modeled as R-10, ST-3 is modeled as R-4, ST-4 is represented by R-12, and ST-5 is modeled as R-13.

Category B receivers assessed in this NSR include single-family and multiple-family residential units, which were chosen primarily because of their proximity to the YBI SFOBB stretch and their potential to be affected by the proposed project. Single-family residential units potentially affected by implementing the proposed project are associated with the USCG facility located southeast. Multiple-family residential units assessed in this NSR include the USCG housing southeast of the SFOBB along Healy Avenue, a vacant barrack building located northwest of the SFOBB south of Macalla Road, and six duplex units located northwest of SFOBB along Forest Road. Category C receivers assessed in this NSR are located northwest and southeast of SFOBB adjacent to North Gate Road and are associated with the former Officers Quarters 1–7 and the USCG station. These category C receivers are generally commercial and governmental development located adjacent to the project area.

Single-family residential units are represented by receivers (R)-11, R-14, and R-15. R-3 and R-6 though R-9 represent 20 multiple-family residential units. R-13 represents a garden area between quarters A and B and is considered a recreational land use.

Single-family residential units are represented by the following individual receiver points:

- R-11 represents a single-family residential unit (Building 9) located east of Hillcrest Drive, at the lower portion of the recreational area associated with the USCG Officers Quarters. R-12 represents a measurement taken in the driveway of the residential unit, whereas R-11 represents the rear yard, which is assumed to be the area of frequent human use. This residence is partially shielded from the SFOBB and the locations

proposed for new ramps by topography. The receiver elevation is approximately 30 feet below the I-80 SFOBB road surface.

- R-14 and R-15 represent two single-family residential units (Quarters A and B) located east of Hillcrest Drive. R-14 and R-15 represent patios, which are assumed to be the areas of frequent human use. The receivers are approximately 20 feet below the I-80 SFOBB road surface. Additionally, these residential units are shielded from the SFOBB and the proposed ramps by topography.

The multiple-family residential units evaluated for impacts are located along Macalla Court and Healy Avenue. These units are represented by receivers R-3 and R-6 through R-9. R-3 represents a vacant barracks building. R-6 through R-9 represent the USCG enlisted quarters. No exterior use area was associated with USCG enlisted quarters; thus, R-6 through R-9 are placed at the building façade to estimate the interior noise levels. The existing USCG quarters are assumed to provide 20-dBA attenuation from exterior noise sources. R-3 and R-6 through R-9 have direct lines of sight to the SFOBB access ramps. Category C receivers evaluated for impact assessment are primarily commercial/governmental development represented by R-1, R-2, R-4, R-5, R-10, R-16, and R-17 (Figure 5). R-1 and R-2 represent event rental facilities known as Quarters 1–7, which include the Nimitz House. R-4 and R-10 represent offices at the USCG station. R-5 represents the USCG station parade grounds, which showed no signs of recreational use. R-17 represents another event rental facility. R-16 represents a noncommercial land use: the USCG Vessel Traffic Service complex. R-1, R-2, R-4, and R-5 have direct lines of sight to the proposed ramp improvement project location and SFOBB.

## **5.2 Field Measurement Procedures**

Long-term (LT) (24-hour) noise measurements were taken on March 30, April 1, and April 6, 2009, to determine the loudest hour or period. The LT noise measurements were captured in 1-hour intervals to determine the loudest hour or hours. During the LT measurements, the sound level meter (SLM) was unattended, and no traffic data were collected. The LT measurement locations are shown in Figure 5.

ST (10- to 20-minute) noise measurements were also taken on these days, to measure existing noise levels and record general traffic characteristics at selected receiver points. Because of the constant traffic flow on I-80, these measurement intervals were sufficient to characterize hourly traffic noise levels. ST noise level measurements taken outside the loudest period were adjusted up to normalize the data to the loudest period as defined by the 24-hour





### Figure 5 Noise Measurement and Receiver Locations



measurements. Detailed measurement data, including noise levels, observations, weather conditions, and field measurement logs, are included in Appendix A. The results of the measurements are discussed in Section 6.2. SLM setup and instrumentation are discussed below.

### **5.2.1 Instrumentation and Setup**

Two SLMs were used to measure existing noise in the project vicinity. A Larson-Davis Laboratories Model 820 (LD820) Type 1 SLM (serial number [SN]: 820A1176) was used, with the following parameters:

Filter:	A-weighted
Response:	Fast
Time History Period:	1 minute

A Larson-Davis Laboratories Model 824 (LD824) Type 1 SLM (SN: 824 A2624) was also used, with the following parameters:

Filter:	A-weighted
Response:	Slow
Time History Period:	1 minute

SLM calibration was checked with Larson-Davis CAL200 (SN: 4637 and SN: 4214) calibrators before and after use. Premeasurement and postmeasurement calibration results were within 0.1 dBA, and no corrections were made to results. The two SLMs were also tested with side-by-side measurements to determine differences in instrument sensitivity. The LD820 measurement was 0.3 dBA lower than the LD824 measurement. For all noise measurements, the SLMs were placed 5 feet above the existing ground level.

### **5.2.2 Meteorology**

Wind and temperature measurements were made at the time of existing noise measurements because atmospheric conditions can cause noise levels to fluctuate by 10 dBA or more at locations distant from the freeway. The fluctuations are generally less at closer distances. Wind and vertical temperature differentials cause the greatest meteorological effects on noise levels and propagation. A vertical gradient of temperature or wind velocity can produce a vertical gradient of sound velocity, which can cause sound waves to refract or bend. Wind speeds averaged less than 3 miles per hour (mph) during all measurements. The results of meteorological measurements are discussed further in Section 6.3.

### **5.2.3 Data Reduction**

Noise-level data were captured in the SLMs and then electronically transferred to a desktop computer using the Larson-Davis UTIL and the Larson-Davis 824 Utility programs. Average



noise levels for each measurement were calculated summing the time-energy products for each interval of measurement and converting them to the  $L_{eq}$  metric.

### **5.3 Traffic Noise Prediction**

TNM 2.5 was used to predict existing and future traffic noise levels at specific receiver locations. Inputs to TNM 2.5 include the three-dimensional coordinates of:

- roadways, noise receivers, and topographic or planned barriers that would affect noise propagation;
- vehicle volumes and speeds, by type of vehicle;
- absorption (drop-off) factors; and
- adjustment factors.

The model outputs are noise levels at the selected receiver points. Receivers at exterior locations and ground-floor windows are modeled 5 feet above the ground elevation.

### **5.4 Traffic Parameters**

Existing and future traffic volumes on all project area roadways were taken from the project traffic report (AECOM 2009a). Existing speeds were developed from site visits and time spent driving the alignment. Vehicle mixes for I-80 were taken from the *2007 Annual Average Daily Truck Traffic on the California State Highway System* (Caltrans 2008). Field counts taken in conjunction with ST noise measurements on April 1 and April 3, 2009, were used to develop the vehicle mix for local roadways.

Future traffic speeds and vehicle mixes on all study roadways were assumed to be the same as those used in the existing conditions. Future (2035) traffic volumes for the No-Build Alternative were obtained from the project traffic report (AECOM 2009a). The project traffic report did not include an evaluation of traffic volumes on local roadway; therefore, for purposes of this NSR, level of service (LOS) C segment volumes were used on local roadways to determine traffic noise levels. Based on information provided by the project traffic engineer, LOS C volumes on Yerba Buena Road, Healy Avenue, and Macalla Road would be approximately 700 vehicles per hour per lane (AECOM 2009b). Table 3 identifies the traffic volume mix used in the model. Traffic volumes used in the noise modeling for each scenario are presented in Appendix B.

**Table 3. Traffic Volume Mix Used in TNM 2.5**

<b>Roadway Segment</b>	<b>Automobiles (percent)</b>	<b>Medium Trucks (percent)</b>	<b>Heavy Trucks (percent)</b>
I-80 and access ramps	97.1	1.3	1.6
Local roadways (Yerba Buena Road, Healy Avenue, and Macalla Road)	97	2	1
Sources: Caltrans 2008, data provided by EDAW in 2009 based on field observations			

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## CHAPTER 6 EXISTING NOISE ENVIRONMENT

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### 6.1 Project Area

YBI is surrounded by San Francisco Bay waters; the San Francisco mainland is approximately 2 miles to the west, and Oakland is about 2 miles to the east. YBI is a natural island that has been used by private parties and the U.S. Army and Navy since the 1840s. It is steeply sloped and highly vegetated. The USCG occupies approximately 35 acres on the southeast side of YBI, and Caltrans occupies about 20 acres of YBI with portions of the SFOBB and tunnel.

YBI is a portion of the former Naval Station Treasure Island, which was owned by the Navy and encompasses approximately 489 acres of land. Approximately 10 buildings previously used by the military primarily for storage, communications, fire safety, and administrative purposes are located on YBI. In addition, there are 105 residential units, 10 of which are large single-family residences originally built for officers; the remainder consists of two-, three-, and four-unit residences, generally single story. Of these 105 residential units, about 95 units, located on the western and central parts of YBI, are occupied as market-rate civilian housing.

Land uses on the eastern side of YBI in the vicinity of the project site include Quarters 1–7. Built in the early 1900s as officers' quarters, they are now designated as a historic district. Quarters 1–7 have been renovated and are leased out by the city and county of San Francisco as locations for events and meetings. Two other buildings are located on the eastern side of YBI.

The Navy closed Naval Station Treasure Island military operations in 1997 and transferred interim control of most of its property to the Treasure Island Development Authority via a cooperative agreement. It intends to transfer all the property to the Treasure Island Development Authority.

An active, approximately 41-acre USCG station is located on the southeast side of YBI. The station includes Coast Guard Group San Francisco facilities, which include housing, administrative, open storage and docks, and buoy maintenance facilities. It also includes a lighthouse built by the U.S. Army in 1872. Additionally, Navigation Light No. 6, which is located at the tip of the breakwater on the northern end of Treasure Island, is a USCG facility.

### 6.2 Noise Receivers

The noise receivers analyzed in the project area are located along both the east and west sides of I-80 on the SFOBB and at the proposed locations for the ramp improvements, as shown in Figures 6 and 7. Most of the category B receivers in the project area are single-family and multiple-family residential units. For this NSR, 17 receivers were used to represent three single-family residential units, 20 multiple-family residential units, 12 commercial/governmental units, one recreational area, and one driveway.

The single-family residential units for which noise levels were assessed are located east of the YBI SFOBB stretch, along Hillcrest Road. Single-family residential units located in the USCG station and serving as the officers quarters are represented by R-11 and R-14 and R-15, which are located along the eastern side of Hillcrest Road. R-11, R-14, and R-15 are known as Building 9 and Quarters A and B, respectively. R-12, located in the driveway nearest the project site, was used as a model calibration point. R-13 is located between Quarters A and B and represents a recreational area.

R-3 and R-6 through R-9 represent 20 multiple-family residential units in the project area (Figure 5). R-3 represents an abandoned barrack. R-6 through R-9 represent USCG quarters.

Category C receivers evaluated in the impact assessment are commercial/governmental development and are represented by R-1, R-2, R-4, R-5, R-10, R-16, and R-17 (Figure 5). R-1, R-2, and R-17 represent event rental facilities. R-4, R-5, and R-10 represent non-residential uses, offices and parade grounds, at the USCG station. R-16 represents the USCG Vessel Traffic Service complex. R-1, R-2, R-4, R-5, and R-10 have direct lines of sight to the proposed ramp improvement project location and the YBI SFOBB stretch.

### **6.3 Existing Noise Level Measurements**

Site visits and noise measurements were conducted on March 30 and on April 1 and 6, 2009 (see Appendix A for details). For each measurement location, the SLM was placed 5 feet above the existing ground elevation. A summary of the 24-hour measurements is provided in Tables 4 through 8.

Measurement data for LT-1 indicate that the loudest period of the day is the 6:00 a.m. hour (Table 4). Noise levels for LT-1 are consistent for most of the day, fluctuating by no more than 1 dBA between 4:00 a.m. and 10:00 p.m.

Measurement data for LT-2 indicate that the loudest period of the day is the 7:00 a.m. hour (Table 5). Daytime noise levels for LT-2 are relatively consistent, fluctuating by no more than 2 dBA between 6:00 a.m. and 8:00 p.m.

**Table 4. Summary of LT-1,  
March 30, 2009**

Time	L <sub>eq</sub>	Time	L <sub>eq</sub>
12:00 a.m.	65.3	12:00 p.m.	71.1
1:00 a.m.	60.9	1:00 p.m.	71.2
2:00 a.m.	61.5	2:00 p.m.	70.4
3:00 a.m.	65.2	3:00 p.m.	70.0
4:00 a.m.	70.3	4:00 p.m.	69.7
5:00 a.m.	71.3	5:00 p.m.	69.6
<b>6:00 a.m.</b>	<b>71.4</b>	6:00 p.m.	71.0
7:00 a.m.	71.1	7:00 p.m.	71.2
8:00 a.m.	70.3	8:00 p.m.	71.0
9:00 a.m.	71.3	9:00 p.m.	70.4
10:00 a.m.	71.2	10:00 p.m.	68.8
11:00 a.m.	70.9	11:00 p.m.	67.3

Note: Bolded numbers indicate the loudest hour.

Source: Data compiled by EDAW in 2009.

**Table 5. Summary of LT-2,  
March 30, 2009**

Time	L <sub>eq</sub>	Time	L <sub>eq</sub>
12:00 a.m.	61.0	12:00 p.m.	66.1
1:00 a.m.	60.3	1:00 p.m.	66.7
2:00 a.m.	60.2	2:00 p.m.	66.8
3:00 a.m.	60.5	3:00 p.m.	66.5
4:00 a.m.	63.6	4:00 p.m.	66.5
5:00 a.m.	65.7	5:00 p.m.	66.7
6:00 a.m.	66.9	6:00 p.m.	66.8
<b>7:00 a.m.</b>	<b>67.4</b>	7:00 p.m.	66.1
8:00 a.m.	67.2	8:00 p.m.	65.8
9:00 a.m.	66.8	9:00 p.m.	64.9
10:00 a.m.	66.5	10:00 p.m.	64.0
11:00 a.m.	66.0	11:00 p.m.	62.8

Note: Bolded numbers indicate the loudest hour.

Source: Data compiled by EDAW in 2009.

Measurement data for LT-3 indicate that the loudest period of the day is the 7:00 a.m. hour (Table 6). Noise levels for LT-3 are consistent between 6:00 a.m. and 6:00 p.m., fluctuating by no more than 1 dBA during this period.



**Table 6. Summary of LT-3,  
March 30, 2009**

Time	L <sub>eq</sub>	Time	L <sub>eq</sub>
12:00 a.m.	62.6	12:00 p.m.	69.3
1:00 a.m.	61.7	1:00 p.m.	69.7
2:00 a.m.	61.6	2:00 p.m.	69.4
3:00 a.m.	63.1	3:00 p.m.	69.0
4:00 a.m.	66.5	4:00 p.m.	68.8
5:00 a.m.	68.2	5:00 p.m.	69.0
6:00 a.m.	69.6	6:00 p.m.	69.0
<b>7:00 a.m.</b>	<b>70.4</b>	7:00 p.m.	68.2
8:00 a.m.	69.5	8:00 p.m.	68.1
9:00 a.m.	69.4	9:00 p.m.	67.1
10:00 a.m.	69.1	10:00 p.m.	66.3
11:00 a.m.	69.0	1:00 p.m.	65.0
Note: Bolded numbers indicate the loudest hour. Source: Data compiled by EDAW in 2009.			

Measurement data for LT-4 indicate that the loudest period of the day is the 6:00 a.m. hour (Table 7). Noise levels for LT-4 do not fluctuate by more than 2 dBA between 5:00 a.m. and 4:00 p.m., but there is a marked drop in noise levels after 2:00 p.m. that continues until 6:00 a.m.

**Table 7. Summary of LT-4,  
April 2, 2009**

Time	L <sub>eq</sub>	Time	L <sub>eq</sub>
12:00 a.m.	56.8	12:00 p.m.	63.0
1:00 a.m.	55.5	1:00 p.m.	64.0
2:00 a.m.	54.9	2:00 p.m.	62.0
3:00 a.m.	56.5	3:00 p.m.	62.3
4:00 a.m.	59.9	4:00 p.m.	61.1
5:00 a.m.	63.6	5:00 p.m.	61.3
<b>6:00 a.m.</b>	<b>64.5</b>	6:00 p.m.	62.6
7:00 a.m.	64.3	7:00 p.m.	61.4
8:00 a.m.	64.1	8:00 p.m.	61.7
9:00 a.m.	63.8	9:00 p.m.	61.4
10:00 a.m.	63.6	10:00 p.m.	61.3
11:00 a.m.	62.9	11:00 p.m.	60.3
Note: Bolded numbers indicate the loudest hour. Source: Data compiled by EDAW in 2009.			

Measurement data for LT-5 indicate that the loudest period of the day is the 4:00 a.m. hour (Table 8). Noise levels for LT-5 fluctuate by approximately 2 dBA between 4:00 a.m. and 3:00 p.m., but there is a marked drop in noise levels after 3:00 p.m. that continues until 3:00 a.m.

**Table 8. Summary of LT-5,  
April 6, 2009**

Time	L <sub>eq</sub>	Time	L <sub>eq</sub>
12:00 a.m.	63.0	12:00 p.m.	71.7
1:00 a.m.	62.6	1:00 p.m.	71.6
2:00 a.m.	64.5	2:00 p.m.	71.4
3:00 a.m.	68.1	3:00 p.m.	71.0
4:00 a.m.	71.9	4:00 p.m.	62.6
<b>5:00 a.m.</b>	<b>73.1</b>	5:00 p.m.	68.2
6:00 a.m.	72.4	6:00 p.m.	70.4
7:00 a.m.	71.8	7:00 p.m.	69.3
8:00 a.m.	72.1	8:00 p.m.	69.1
9:00 a.m.	71.7	9:00 p.m.	68.6
10:00 a.m.	71.6	10:00 p.m.	66.5
11:00 a.m.	71.2	11:00 p.m.	64.3

Note: Bolded numbers indicate the loudest hour.  
Source: Data compiled by EDAW in 2009.

Noise measurement data presented in Tables 4 through 8 is generally consistent with the project traffic report, which indicates that a.m. peak-hour traffic volumes for I-80 are higher than p.m. peak-hour traffic volumes.

ST noise levels were measured between the hours of 11:00 a.m. and 3:30 p.m. at selected receivers and at other points of interest in the project area (Figure 5). Weather conditions were clear and warm, 67 degrees Fahrenheit (°F) to 90°F, with a slight breeze, less than 3 mph each day. All ST noise measurements were taken outside the loudest hour and were normalized (i.e., adjusted) to reflect the loudest hour based on the results of the 24-hour measurements (see Table 4 though 8 and Appendix C).

Since I-80 is a continuous noise source, background noise (i.e., noise without the traffic noise from I-80 or other local roadways) is not easily measured. However, based on a review of the detailed noise measurement data provided in Appendix A, the background noise level may be estimated at less than 60 dBA L<sub>eq</sub>, based on the L<sub>90</sub> measurement (which represents the noise level exceeded 90 percent of the time during the measurement) at ST measurement sites 4

and 5. The ST noise measurements and the adjusted loudest hour for each location are summarized in Table 9.

**Table 9. Short-Term Noise Measurement Summary**

Site I.D. <sup>1</sup>	Location or Address	Type of Development	Measured Noise Level ( $L_{eq(h)}$ , dBA)	Adjusted Worst-Hour Noise Level ( $L_{eq(h)}$ , dBA)
ST-1	1 Whiting Way, historical village	Commercial	70.4	71.4
ST-2	North Gate Road, USCG station, north offices	Governmental	64.9	65.9
ST-3	North Gate Road, USCG station, south parking lot	Governmental	70.4	71.4
ST-4	Hill Crest Road, USCG, Officers Quarters	Single-family residential	60.5	63.5
ST-5	Hill Crest Road, USCG, Officers Quarters	Single-family residential	57.9	59.9

<sup>1</sup> See Figure 5.  
Source: Data compiled by EDAW in 2009.

The dominant noise source in the project area—traffic on major local roadways, such as Yerba Buena Road and Macalla Road—represented additional secondary noise sources with a noticeable but negligible effect on the ambient noise levels as compared to I-80. Smaller local roadways, including Forest Road, Healy Avenue, and Hillcrest Crest Road, had limited traffic volumes and low speeds, which had a minor effect on ambient noise levels in the project area.

## 6.4 Predicted Existing Noise Levels and Calibration

The purpose of model calibration is to ‘fine-tune’ the prediction model to actual site conditions that are not adequately accounted for by the model. Calibration is performed by algebraically adding a constant, or K-factor, to the noise level calculated in TNM 2.5. The magnitude of K-factors is initially determined by the difference between measured and modeled noise levels at specific points. Calibration factors may be positive or negative. Additional factors may be applied based on the experience and judgment of the noise engineer performing the analysis.

Section N-5400 of the TeNS, ‘Calibrating the Prediction Model,’ provides guidance on the application of calibrations. Subsection N-5420 states, ‘highway reconstruction projects which significantly alter alignments and profiles of an existing highway are also poor candidates for model calibration.’ Additionally, FHWA’s policy for TNM 2.5 states, ‘[n]o adjustments should be made for differences of less than 3 dBA’ (FHWA 2004).

Noise levels were predicted at all receivers, including at ST measurement locations, using TNM 2.5 and various input parameters, as previously discussed, to compare them with adjusted measured traffic noise levels at common points. Differences between measured loudest hour



noise levels and the predicted loudest hour noise levels were less than 3 dBA at all receivers except ST-1 (R-2) and ST-3 (R-4). ST-1 (R-2) and ST-3 (R-4) modeled 4 dBA and 6 dBA below the measured noise level at the same location. The differences at ST-1 and ST-3 are likely due to reflective noise from the double decked structure. K-factors were applied to R-2 and R-4 for the existing condition model run. No K-factors were applied to the future model runs. Because the alignment of the proposed SFOBB would be substantially different from the current alignment of I-80, the proposed project is a poor candidate for calibration under future conditions. Existing measured and predicted noise levels at specific receiver points are compared and shown in Table 10. The existing condition noise model run input and output data are included in Appendix D.

**Table 10. Loudest Hour Noise Level Model Comparison**

Measurement ID <sup>1</sup>	Measured Noise Level $L_{eq}$ (dBA)	Loudest Hour Noise Level Adjustment	Adjusted Loudest Hour Noise Level $L_{eq}$ (dBA)	Predicted Loudest Hour Noise Level $L_{eq}$ (dBA)	Difference (K-Factor)
ST-1	70	1	71	67	4 (4.2)
ST-2	65	1	66	66	0
ST-3	70	1	71	65	6 (5.7)
ST-4	61	3	64	66	-2
ST-5	58	2	60	58	2

<sup>1</sup> See Figure 5.  
Source: Data compiled by EDAW in 2009.

Based on the existing noise levels, one category B receiver (R-3) is affected by existing noise levels that approach or exceed the NAC. The category B receiver represents one 12 multiple-family residential units. Additionally, three category C receivers (R-2, R-4, and R-16) representing seven commercial/governmental units are exposed to existing noise levels that approach or exceed the NAC. Predicted existing noise levels are shown in Chapter 7.

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# CHAPTER 7 FUTURE NOISE ENVIRONMENT, IMPACTS, AND CONSIDERED ABATEMENT

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## 7.1 Predicted Noise Levels – Site Geometry and Traffic

Traffic noise levels were predicted for three future (2035) alternatives: the No-Build Alternative, Alternative 2B (Figure 6), and Alternative 4 (Figure 7). Existing and future traffic volumes on all project area roadways were taken from the project traffic report (AECOM 2009a). Speeds were developed from posted speed limits and time spent driving the existing alignment. Vehicle mixes for I-80 were taken from the 2007 Annual Average Daily Truck Traffic on the California State Highway System report (Caltrans 2008). The traffic mix used for all local streets was 97 percent automobile, 2 percent medium trucks, and 1 percent heavy trucks.

Future traffic speeds and vehicle mixes on all project area roadways were assumed to be the same as those used under existing conditions. The traffic parameters used for the modeling are discussed in detail in Section 5.4, and peak-hour traffic volumes developed from the project traffic report are included in Appendix B.

Receiver and building locations and elevations were taken from topographic survey data provided by the project engineer. Existing and future roadway geometric data were developed from project design drawings provided by the project engineer (AECOM 2009c). Appendix D includes the model input and output sheets for both the No-Build Alternative and both build alternatives.

## 7.2 Traffic Noise Impacts

Predicted noise levels for the three future conditions are shown in Table 11. The changes in traffic noise levels from the existing condition to the 2035 no-build condition would range from -4 to 2 dBA  $L_{eq}$ . Under the No-Build Alternative, noise levels would approach or exceed the NAC at one category B receiver (R-3) representing 12 multiple-family residential units. Predicted noise levels at all other category B receivers under the No-Build Alternative would range from 41 to 65 dBA  $L_{eq}$ . Noise levels also would approach or exceed the NAC at one category C receiver (R-16) representing one governmental unit. Predicted noise levels at all other category C receivers would range from 61 to 69 dBA  $L_{eq}$ . The increases in noise levels associated with the No-Build Alternative would be caused by forecasted increases in traffic volumes and by the construction and operation of the new SFOBB (AECOM 2009a).

Under Alternative 2B, noise level changes would range from -4 to 2 dBA over existing conditions and would not change over noise levels under the No-Build Alternative. Under this build alternative, noise levels would approach or exceed the NAC at one category B receiver (R-3)



representing 12 multiple-family residential units. Predicted noise levels at all other category B receivers under this build alternative would range from 41 to 65 dBA  $L_{eq}$ . Noise levels also would approach or exceed the NAC at one category C receiver (R-16) representing one governmental unit. Predicted noise levels at all other category C receivers under this build alternative would range from 61 to 69 dBA  $L_{eq}$ .

Under Alternative 4, noise level changes would range from -4 to 2 dBA over existing conditions and would not change over noise levels under the No-Build Alternative. Under this build alternative, noise levels would approach or exceed the NAC at one category B receiver (R-3) representing 12 multiple-family residential units. Predicted noise levels at all other category B receivers under either build alternative would range from 41 to 65 dBA  $L_{eq}$ . Noise levels also would approach or exceed the NAC at one category C receiver (R-16) representing one governmental unit. Predicted noise levels at all other category C receivers under this build alternative would range from 61 to 69 dBA  $L_{eq}$ .

As with the No-Build Alternative, the primary cause of the noise level change would be the forecasted increases in traffic volumes. However, unlike with the No-Build Alternative, some noise level changes would be a result of the proposed ramps under each build alternative. As shown in Table 11, the maximum increase associated with either build alternative would be 2 dBA  $L_{eq}$ , which is below the Caltrans threshold for a substantial increase. Thus, implementing the proposed project would not result in a substantial increase.

### **7.3 Noise Abatement**

Noise abatement must be considered where traffic noise impacts are identified. According to FHWA-Caltrans criteria, noise abatement must be considered at affected receivers where there is an exposed area of frequent human use (such as a yard, patio, or deck) and a lowered noise level would be of benefit. Frequent human use is defined as any activity that would result in frequent human exposure to traffic noise over the course of a year in a specific location. In practice, for an area to be considered it must be continuously occupied for at least one hour per day.

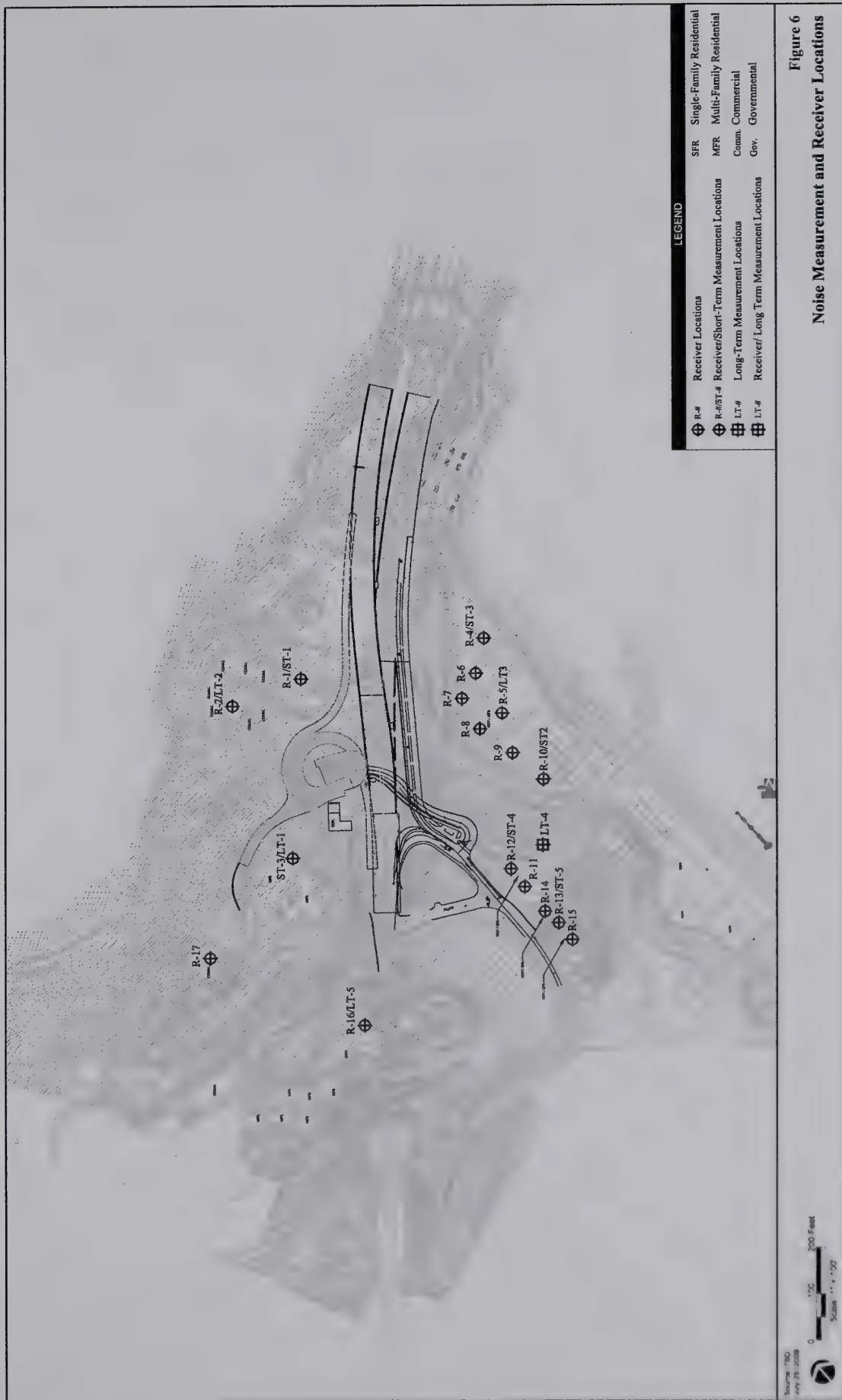
Impacts have been identified at two receivers under both of the build alternatives. R-16 represents a governmental unit. Although this receiver represents an area of human use, it is associated with a parking lot that has only transitory use (i.e. less than an hour) and would not result in a cumulative amount of time on a daily, weekly, or yearly level that would be considered frequent or have detrimental effects on the activities of humans at the receiver location. Thus, a lowered noise level at this location would not be a benefit and abatement is not considered further for R-16. Future plans would relocate personnel associated with this site to a lower portion of USCG Sector San Francisco. R-3 represents a residential use; however, there is no current occupation, and the building is anticipated to be demolished and future plans for development are uncertain at this time (AECOM 2011). Thus, as with R-16, R-3 does not have

an area of frequent human use and there would not be a benefited receiver; abatement is not considered further for R-3.

A Noise Abatement Decision Report (NADR) is typically prepared when a NSR identifies receiver locations that are exposed to noise levels the approach or exceed NAC and those receivers are areas of frequent human use and abatement would be beneficial. As stated above, both R-3 and R-16 are in areas where NAC is approached or exceeded, however neither receiver is in a location of frequent human use or abatement would benefit a receiver. Therefore, a NADR would not be required.

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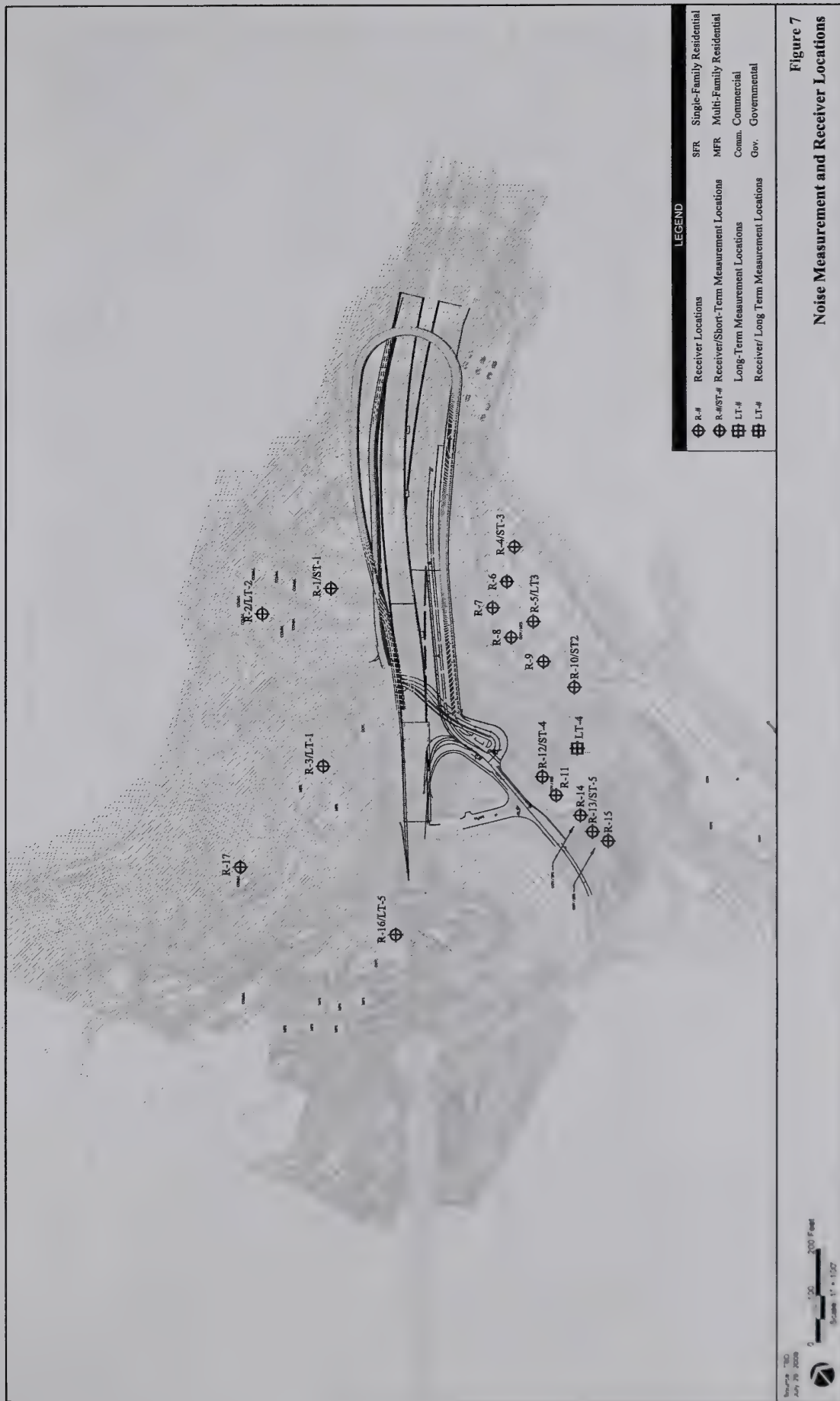






Table 11. Predicted Noise Levels

Receiver ID.	Location or Address	Type of Development	Number of Units Represented	NAC	Existing		No-Build Alternative		Alternative 2B		Alternative 4	
					Predicted Noise Level (dBA L <sub>eq</sub> )	Predicted Noise Level (dBA L <sub>eq</sub> )	Predicted Noise Level (dBA L <sub>eq</sub> )	Increase Less Existing (dBA L <sub>eq</sub> )	Predicted Noise Level (dBA L <sub>eq</sub> )	Increase, Build Less Existing (dBA L <sub>eq</sub> )	Predicted Noise Level (dBA L <sub>eq</sub> )	Increase, Build Less Existing (dBA L <sub>eq</sub> )
R-1	7 Whiting Way, event rental	Commercial	2	C (72)	68	67	67	-1	67	-1	67	-1
R-2	1 Whiting Way, historical village	Commercial	5	C (72)	71	69	69	-2	69	-2	69	-2
R-3	240 Macalla Road, U.S. Coast Guard, Abandon Barrack	Multi-family residential	12	B (67)	74	73	73	-1	73	-1	73	-1
R-4	North Gate Road, U.S. Coast Guard station, north offices	Governmental	1	C (72)	71	67	67	-4	67	-4	67	-4
R-5	North Gate Road, U.S. Coast Guard station, parade ground	Governmental	1	C (72)	70	67	67	-3	67	-3	67	-3
R-6	U.S. Coast Guard, quarters <sup>1</sup>	Multi-family residential	2	E (52)	47	47	47	0	47	0	47	0
R-7	U.S. Coast Guard, quarters <sup>1</sup>	Multi-family residential	2	E (52)	47	47	47	0	47	0	47	0
R-8	U.S. Coast Guard, quarters <sup>1</sup>	Multi-family residential	2	E (52)	44	44	44	0	44	0	44	0
R-9	U.S. Coast Guard, quarters <sup>1</sup>	Multi-family residential	2	E (52)	43	43	43	0	43	0	43	0
R-10	North Gate Road, U.S. Coast Guard station, south parking lot	Governmental	1	C (72)	66	65	65	-1	65	-1	65	-1
R-11	Hill Crest Road, U.S. Coast Guard, Officers Quarters (Building 9)	Single-family residential	1	B (67)	55	54	54	-1	54	-1	54	-1
R-12	Hill Crest Road, U.S. Coast Guard, Officers Quarters	Driveway	0	--	66	66	66	0	66	0	66	0
R-13	Hill Crest Road, U.S. Coast Guard, Officers Quarters	Recreational area	1	B (67)	57	58	58	1	58	1	58	1
R-14	Hill Crest Road, U.S. Coast Guard, Officers Quarters (A)	Single-family residential	1	B (67)	65	65	65	0	65	0	65	0
R-15	Hill Crest Road, U.S. Coast Guard, Officers Quarters (B)	Single-family residential	1	B (67)	62	64	64	2	64	2	64	2
R-16	Signal Road, U.S. Coast Guard, Vessel Traffic Service complex	Governmental	1	C (72)	71	73	73	2	73	2	73	2
R-17	62 Macalla Road, event rental	Commercial	1	C (72)	60	61	61	1	61	1	61	1

Note: A/E = approach or exceed; NA = not applicable; NAC = Noise Abatement Criterion. Bold = traffic noise impact

<sup>1</sup> Noise levels reported for these receivers are reduced by 20 dBA to represent interior noise levels.

Source: Data compiled by EDAN in 2009.

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#### **7.4 Feasibility of Noise Abatement**

Noise abatement is not being considered; thus, a feasibility analysis is not required and has not been conducted.

#### **7.5 Reasonable Noise Abatement**

Noise abatement is not being considered; thus, a reasonable allowance analysis is not required.

#### **7.6 Areas Where Abatement Is Not Feasible**

Noise abatement is not being considered; thus, none have been found feasible.

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# CHAPTER 8 CONSTRUCTION NOISE

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## 8.1 Applicable Standards

### 8.1.1 California Department of Transportation

The Protocol requires that a noise assessment of potential adverse construction noise impacts on local receivers and activities be performed using a reasonable analysis method (Caltrans 2006).

As part of the specifications for construction contracts, the Caltrans requirements relative to the allowable noise emission of equipment must be used on the proposed project. Sound control must conform to the provisions in Section 14-8.02, 'Noise Control,' of the Standard Specifications and the following special provisions:

- 1) The noise level requirement shall apply to the equipment on the job or related to the job, including but not limited to trucks, transit mixers or transient equipment that may or may not be owned by the Contractor. The use of loud signals shall be avoided in favor of light warnings except those required by safety laws for the protection of personnel.
- 2) Full compensation for conforming to the requirements of this section shall be considered as included in the prices paid for the various contract items of work involved and no additional compensation will be allowed therefore.

Caltrans's Standard Specification Section 14-8.02, 'Noise Control,' states the following:

The noise level from operations, between the hours of 9:00 p.m. and 6:00 a.m., shall not exceed 86 dBA at a distance of 50 feet.

Each internal combustion engine, used for any purpose on the job or related to the job, shall be equipped with a muffler of a type recommended by the manufacturer. No internal combustion engine shall be operated on the project without said muffler.

## 8.2 Impacts

### 8.2.1 Construction Activities

#### CONSTRUCTION STAGING

The staging areas for both Alternative 2B and Alternative 4 would be the same. Both alternatives would use the staging areas used for the SFOBB East Span Seismic Safety Project. The primary staging area is located east of the Officers Quarters Historic District and north of the SFOBB. Each alternative would use a secondary staging area south of the SFOBB and north of the USCG facilities. Storage of equipment and materials on-site would be limited to the



staging and construction areas to minimize ground disturbance. Access for construction vehicles and equipment would be via Macalla Road, South Gate Road, and North Gate Road.

### **CONSTRUCTION METHODS**

Both build alternatives would involve standard construction techniques and require large-scale construction equipment and labor-intensive activities. General activities would include:

- excavation and grading,
- removal of vegetation,
- erection of temporary falsework,
- roadway and ramp construction,
- landscaping, and
- demobilization.

Equipment would include drill rigs, backhoes, cranes, concrete trucks, and delivery trucks. The construction period is estimated to be 2 years for either of the build alternatives.

### **CONSTRUCTION TIMING**

Construction staging for the build alternatives assumes that a typical construction schedule would be used for the proposed project. Some activities could occur during hours of low traffic volumes. Scheduling construction activities during these hours would ensure that roadways in the construction area are open during the peak traffic times to minimize disruption. The types of construction activities that may occur in the hours of low traffic volumes are:

- erection of falsework to permit construction of ramps,
- construction of Macalla Road and retaining wall, and
- relocation of substation stairway.

Construction noise would be generated by diesel engine–driven construction equipment used for site preparation and grading, removal of existing pavement, loading, unloading, and placing materials and paving. Diesel engine–driven trucks also would bring materials to the site and remove the spoils from excavation. No pile driving or blasting would be required as part of the proposed project.

Under load conditions, diesel engine noise levels may be 85–90 dBA at a distance of 50 feet from the equipment (FHWA 2006). Construction equipment noise is considered a point source and is attenuated over distance at a rate of 6 dBA for each doubling of distance. Thus, a noise level of 85 dBA at 50 feet would be 79 dBA at 100 feet and 73 dBA at 200 feet from the source.

During excavating, grading, and paving operations, equipment moves to different locations and goes through varying load cycles, and there are breaks for the operators and for nonequipment tasks, such as measurement. Although maximum noise levels may be 85–90 dBA at a distance

of 50 feet during most construction activities, hourly average noise levels near the edge of the project site at locations where the excavation, grading, and paving occur would be anticipated to be 65–75 dBA  $L_{eq}$ . Maximum noise levels during pavement breaking would be approximately 90 dBA  $L_{max}$ .

The nearest occupied residential units (R-6 through R-9 and R-11 through R-15) are located approximately 330 feet from the nearest point of construction activities. R-3 is closer but is unoccupied with no known plans for occupation. Hourly construction noise levels at this distance would attenuate to approximately 59 dBA  $L_{eq}$ , with a maximum noise level of 73 dBA  $L_{max}$ . Based on the existing modeling and measurements, these noise levels would barely be noticeable over existing noise levels. Therefore, construction-related noise impacts would not occur from diesel engine noise associated with development of the proposed project.

Some construction activities associated with the proposed improvements (specifically, paving and striping for detour lanes) must take place during nighttime hours to avoid greater daytime traffic. As described previously, noise levels from these activities would be on the order of 75 dBA  $L_{eq}$  at 50 feet from construction activity. Residential units would be located approximately 330 feet from these activities, so nighttime construction activities are not expected to generate noise levels sufficient to disturb local residents. Based on the 24-hour measurement (LT-4), noise levels even during the quiet hour are on the order of 63 dBA  $L_{eq}$ ; therefore, the nighttime construction activity would result in less than a 2-dBA increase at nearby residential units. However, even if noise associated with construction were audible at these residences, these activities would be temporary in nature and would not be considered an adverse impact.

To summarize, construction noise may be heard at nearby sensitive receivers and may cause occasional speech disruption, principally during times of pavement breaking or use of impact equipment. Thus, construction-related noise would not be considered adverse. Measures to minimize construction noise impacts are discussed below.

### **8.3 Construction Noise Abatement**

The following measures are recommended to avoid or minimize construction noise impacts:

- As required by Caltrans's Standard Specification 14-08.02, each internal combustion engine shall be equipped with a muffler of a type recommended by the manufacturer. No internal combustion engine shall be operated on the project site without said muffler.
- Staging areas shall be located at least 500 feet from occupied residential units. Work in staging areas that generates loud noises, such as equipment maintenance, shall not occur during the hours prohibited for construction work.

- If traffic control and construction signs that require power for lighting or flashing are located near residential units, the source of power will be batteries, solar cells, or another quiet source. Gas- or diesel-fueled internal combustion engines will not be used.



## CHAPTER 9 REFERENCES

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## CHAPTER 10 LIST OF PREPARERS

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The following personnel are responsible for preparing this NSR:

AECOM EDAW

1420 Kettner Boulevard, Suite 500

San Diego, California 92101

Bill Graham, Principal

Tammy Chan, Project Manager

Marisa Grivas, Assistant Project Manager

Honey Walters, Senior Noise and Air Quality Specialist, Principal Reviewer

Bill Maddux, Senior Noise and Air Quality Specialist, Principal Preparer

Dan Brady, Graphic Artist

Anabel Ruiz, Landscape Designer



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## **APPENDIX A**

### **NOISE MEASUREMENTS**

*This appendix includes the Field Measurements Summary Log. Field notes, and marked drawings, are available upon request.*





SSA Intervals

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Serial Num A2624

Firmware F 4.283

Software V 3.12

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Descr2: Sacramento, CA

Setup: SLIM&RTA\_ssa

Setup Desc SLIM & Real-Time Analyzer

Location: ST-1

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Note 2:

Weighting: A

Peak Weigl Flat

Detector: Slow

RTA Detect Fast

Rec #	Date	Time	Duration	Leq	SEL	LMin	LMax	UwPk	Peak	L1.00	L5.00	L50.00	L90.00	L95.00	L99.00	
1	1-Apr-09	10:10:05	15:00.0	70.4	70.4	100	65.8	72.7	98.6	86	72.691	71.933	70.457	68.566	67.863	66.379

SSA Intervals

Translated: 14-Jul-09 16:05:54

File Transla C:\Documents and Settings\carrm\Desktop\Y81\Data\Attended Measurements\824\_005.slmdl

Model Num 824

Serial Num A2624

Firmware R 4.283

Software V 3.12

Name: EDAAW

Descr1: 2022 J St

Descr2: Sacramento, CA

Setup: SLM&RTA\_ssa

Setup Desc SLM & Real-Time Analyzer

Location: **ST-2**

Note 1:

Note 2:

Weighting: A

Peak Weigl Flat

Detector: Slow

RTA Detect Fast

Rec #	Date	Time	Duration	Leq	SEL	LMin	LMax	UwPk	Peak	L1.00	L5.00	L50.00	L90.00	L95.00	L99.00
1	1-Apr-09	11:16:57	15:00.0	64.9	64.9	94.5	82.3	74.5	94.9	88	70.824	66.847	64.379	63.215	62.316

SSA Intervals

Translated: 14-Jul-09 16:06:35

File Translated: C:\Documents and Settings\carrm\Desktop\YBI\Data\Attended Measurements\824\_006.slmdl

Model Number: 824

Serial Number: A2624

Firmware Rev: 4.283

Software Version: 3.12

Name: EDAW

Descr1: 2022 J St

Descr2: Sacramento, CA

Setup: SLM&RTA\_ssa

Setup Descr: SLM & Real-Time Analyzer

Location: **ST-3 and ST-4**

Note 1: Record 1 is ST-3

Note 2: Record 2 is ST-4

Weighting: A

Peak Weighting: Flat

Detector: Slow

RTA Detector: Fast

Rec #	Date	Time	Duration	Leq	SEL	LMin	LMax	UwPk	Peak	L1.00	L10.00	L50.00	L90.00	L95.00	L99.00
1	1-Apr-09	11:42:33	15:00.0	70.4	99.9	66.7	75	96.3	91.7	72.777	71.597	70.324	68.871	68.277	67.332
2	1-Apr-09	14:16:31	15:00.0	60.5	90	58.5	64.6	93.2	80.2	62.879	61.511	60.386	59.269	59.09	58.535



SSA Intervals

Translated: 14-Jul-09 16:07:09

File Transla C:\Documents and Settings\carrm\Desktop\YBI\Data\Attended Measurements\824\_007.slmdl

Model Num 824

Serial Num A2624

Firmware R 4.283

Software V 3.12

Name: EDAW

Descr1: 2022 J St

Descr2: Sacramento, CA

Setup: SLM&RTA\_ssa

Setup Desc SLM & Real-Time Analyzer

Location: ST-5

Note 1:

Note 2:

Weighting: A

Peak Weigt Flat

Detector: Slow

RTA Detect Fast

Rec #	Date	Time	Duration	Leq	SEL	LMin	LMax	UwPk	Peak	L1.00	L10.00	L50.00	L90.00	L95.00	L99.00
1	1-Apr-09	14:41:29	15:00.0	57.9	57.9	87.5	56.2	65.3	94.1	94.1	62.465	58.824	57.613	57.011	56.55 56.199

## Interval data

Translated: 17-Jun-2009 03:53:57

Translated File: C:\Documents and Settings\carrm\Desktop\YBI\Data\Continuous Monitoring

SLM: 820A1298

Firmware Rev.: 1.634 13Mar2002

Software: SlmUtility v2.01

EDAW

2022 J Street

Sacramento, CA 95616

**LT-1**

Rec #	Date	Time	Duration	Leq	Lmax	L(50.00)	L(90.00)
63	30-Mar-09	0:00:00	00:00.0	65.3	70.82	64.85	60.38
64	30-Mar-09	1:00:00	00:00.0	60.9	73.17	60.29	57.27
65	30-Mar-09	2:00:00	00:00.0	61.55	70.22	61.15	58.22
66	30-Mar-09	3:00:00	00:00.0	65.22	73.4	63.73	60.16
67	30-Mar-09	4:00:00	00:00.0	70.35	76.52	70.36	68.11
68	30-Mar-09	5:00:00	00:00.0	71.39	75.63	71.34	70.04
<b>69</b>	<b>30-Mar-09</b>	<b>6:00:00</b>	<b>00:00.0</b>	<b>71.4</b>	<b>79.94</b>	<b>71.51</b>	<b>68.8</b>
70	30-Mar-09	7:00:00	00:00.0	71.16	75.37	71.4	67.9
71	30-Mar-09	8:00:00	00:00.0	70.3	75.71	70.55	66.67
72	30-Mar-09	9:00:00	00:00.0	71.3	81.4	71.19	69.97
73	30-Mar-09	10:00:00	00:00.0	71.23	80.66	71.15	69.74
74	30-Mar-09	11:00:00	00:00.0	70.97	76.17	70.9	69.33
75	30-Mar-09	12:00:00	00:00.0	71.14	78.33	71.08	69.53
76	30-Mar-09	13:00:00	00:00.0	71.28	77.42	71.24	70.05
77	30-Mar-09	14:00:00	00:00.0	70.47	77.18	70.38	69.01
78	30-Mar-09	15:00:00	00:00.0	70	75.78	70.19	66.88
79	30-Mar-09	16:00:00	00:00.0	69.76	76.23	69.97	66.72
80	30-Mar-09	17:00:00	00:00.0	69.65	74.8	69.37	65.4
81	30-Mar-09	18:00:00	00:00.0	71	77.45	71.08	67.8
82	30-Mar-09	19:00:00	00:00.0	71.27	77.4	71.21	69.71
83	30-Mar-09	20:00:00	00:00.0	71.06	78.05	70.98	69.11
84	30-Mar-09	21:00:00	00:00.0	70.41	74.45	70.3	67.69
85	30-Mar-09	22:00:00	00:00.0	68.88	75.68	68.65	66.19
86	30-Mar-09	23:00:00	00:00.0	67.39	77.27	67.01	63.83

## Interval data

Translated: 10-Apr-2009 11:12:25

Translated File: H:\Work\YBI Off-Ramps\Continuous Monitoring\LD820 SLM #2.SLMDL

SLM: 820A1176

Firmware Rev.: 1.634 13Mar2002

Software: SlmUtility v2.01

EDAW

2022 J Street

Sacramento, CA 95811

Meter #2

Rec #	Date	Time	Duration	Leq	Lmax	L(50.00)	L(90.00)
	<b>LT-2</b>						
62	30-Mar-10	0:00:00	00:00.0	61.1	67.0	60.7	57.5
63	30-Mar-10	1:00:00	00:00.0	60.3	75.8	59.5	56.5
64	30-Mar-10	2:00:00	00:00.0	60.2	72.2	59.7	57.0
65	30-Mar-10	3:00:00	00:00.0	60.6	68.8	60.1	57.2
66	30-Mar-10	4:00:00	00:00.0	63.7	75.9	63.1	60.5
67	30-Mar-10	5:00:00	00:00.0	65.7	70.2	65.5	63.3
68	30-Mar-10	6:00:00	00:00.0	67.0	75.5	66.8	65.1
<b>69</b>	<b>30-Mar-10</b>	<b>7:00:00</b>	<b>00:00.0</b>	<b>67.4</b>	<b>72.4</b>	<b>67.4</b>	<b>66.1</b>
70	30-Mar-10	8:00:00	00:00.0	67.3	74.1	67.2	65.6
71	30-Mar-10	9:00:00	00:00.0	66.8	76.6	66.7	65.0
72	30-Mar-10	10:00:00	00:00.0	66.5	76.3	66.3	64.4
73	30-Mar-10	11:00:00	00:00.0	66.1	71.4	65.9	64.1
74	30-Mar-10	12:00:00	00:00.0	66.2	70.3	66.1	64.4
75	30-Mar-10	13:00:00	00:00.0	66.7	74.7	66.6	65.3
76	30-Mar-10	14:00:00	00:00.0	66.8	74.9	66.7	65.4
77	30-Mar-10	15:00:00	00:00.0	66.6	75.7	66.5	64.8
78	30-Mar-10	16:00:00	00:00.0	66.5	72.1	66.4	65.3
79	30-Mar-10	17:00:00	00:00.0	66.7	71.5	66.6	65.4
80	30-Mar-10	18:00:00	00:00.0	66.8	77.0	66.6	65.1
81	30-Mar-10	19:00:00	00:00.0	66.1	70.7	66.0	64.3
82	30-Mar-10	20:00:00	00:00.0	65.9	71.4	65.8	63.8
83	30-Mar-10	21:00:00	00:00.0	64.9	69.7	64.9	61.4
84	30-Mar-10	22:00:00	00:00.0	64.1	70.3	63.9	61.1
85	30-Mar-10	23:00:00	00:00.0	62.9	71.2	62.4	58.5



## LT-4

135	2-Apr-10	0:00:00	00:00.0	56.8	66.9	56.5	54.4
136	2-Apr-10	1:00:00	00:00.0	55.5	65.9	55.2	52.9
137	2-Apr-10	2:00:00	00:00.0	55.0	69.2	54.0	51.7
138	2-Apr-10	3:00:00	00:00.0	56.5	62.0	56.3	54.0
139	2-Apr-10	4:00:00	00:00.0	60.0	65.4	59.9	57.5
140	2-Apr-10	5:00:00	00:00.0	63.7	68.9	63.5	61.8
<b>141</b>	<b>2-Apr-10</b>	<b>6:00:00</b>	<b>00:00.0</b>	<b>64.5</b>	<b>76.2</b>	<b>64.0</b>	<b>62.5</b>
142	2-Apr-10	7:00:00	00:00.0	64.3	77.1	64.0	62.6
143	2-Apr-10	8:00:00	00:00.0	64.2	70.9	63.8	62.4
144	2-Apr-10	9:00:00	00:00.0	63.8	78.1	63.4	62.2
145	2-Apr-10	10:00:00	00:00.0	63.7	75.8	62.7	61.3
146	2-Apr-10	11:00:00	00:00.0	63.0	71.4	62.6	61.4
147	2-Apr-10	12:00:00	00:00.0	63.0	69.6	62.7	61.6
148	2-Apr-10	13:00:00	00:00.0	64.0	69.4	62.9	61.5
149	2-Apr-10	14:00:00	00:00.0	62.0	73.6	61.7	61.0
150	2-Apr-10	15:00:00	00:00.0	62.3	73.3	62.0	61.1
151	2-Apr-10	16:00:00	00:00.0	61.2	67.3	61.0	60.1
152	2-Apr-10	17:00:00	00:00.0	61.3	71.2	61.1	60.1
153	2-Apr-10	18:00:00	00:00.0	62.7	79.0	62.2	61.2
154	2-Apr-10	19:00:00	00:00.0	61.5	76.9	61.3	60.2
155	2-Apr-10	20:00:00	00:00.0	61.7	69.3	61.6	60.4
156	2-Apr-10	21:00:00	00:00.0	61.5	69.7	61.3	60.1
157	2-Apr-10	22:00:00	00:00.0	61.4	72.7	61.1	59.9
158	2-Apr-10	23:00:00	00:00.0	60.3	64.9	60.3	58.9

## Interval data

Translated: 10-Apr-2009 10:47:50

Translated File: H:\Work\YBI Off-Ramps\Continuous Monitoring\LD820 SLM #4.SLMDL

SLM: 820A1710

Firmware Rev.: 1.634 13Mar2002

Software: SlmUtility v2.01

EDAW

2022 J Street

Sacramento, CA 95811

## LT-3

Rec #	Date	Time	Duration	Leq	Lmax	L(50.00)	L(90.00)
58	30-Mar-10	0:00:00	00:00.0	62.61	68.08	62.36	59.81
59	30-Mar-10	1:00:00	00:00.0	61.72	70.32	61.3	58.62
60	30-Mar-10	2:00:00	00:00.0	61.68	73.32	61.15	59.03
61	30-Mar-10	3:00:00	00:00.0	63.13	67.93	62.92	60.41
62	30-Mar-10	4:00:00	00:00.0	66.51	74.8	66.36	64.42
63	30-Mar-10	5:00:00	00:00.0	68.22	71.03	68.17	66.58
64	30-Mar-10	6:00:00	00:00.0	69.62	75.4	69.56	68.38
<b>65</b>	<b>30-Mar-10</b>	<b>7:00:00</b>	<b>00:00.0</b>	<b>70.4</b>	<b>79.91</b>	<b>70.33</b>	<b>69.24</b>
66	30-Mar-10	8:00:00	00:00.0	69.55	73.72	69.46	68.29
67	30-Mar-10	9:00:00	00:00.0	69.48	78.51	69.31	68.08
68	30-Mar-10	10:00:00	00:00.0	69.13	77.1	68.97	67.87
69	30-Mar-10	11:00:00	00:00.0	69.06	77.9	68.79	67.57
70	30-Mar-10	12:00:00	00:00.0	69.32	73.91	69.29	68.04
71	30-Mar-10	13:00:00	00:00.0	69.71	74.9	69.61	68.74
72	30-Mar-10	14:00:00	00:00.0	69.45	77.37	69.4	68.36
73	30-Mar-10	15:00:00	00:00.0	69.01	76.89	69.18	67.23
74	30-Mar-10	16:00:00	00:00.0	68.81	83.5	68.63	67.92
75	30-Mar-10	17:00:00	00:00.0	69.08	72.83	69.01	68.11
76	30-Mar-10	18:00:00	00:00.0	69.01	74.2	68.94	67.75
77	30-Mar-10	19:00:00	00:00.0	68.25	74.13	68.23	67.01
78	30-Mar-10	20:00:00	00:00.0	68.17	73.86	68.02	66.5
79	30-Mar-10	21:00:00	00:00.0	67.1	70.44	67.15	64.51
80	30-Mar-10	22:00:00	00:00.0	66.32	70.65	66.28	64.18
81	30-Mar-10	23:00:00	00:00.0	65.06	71.63	64.88	61.95

## LT-5

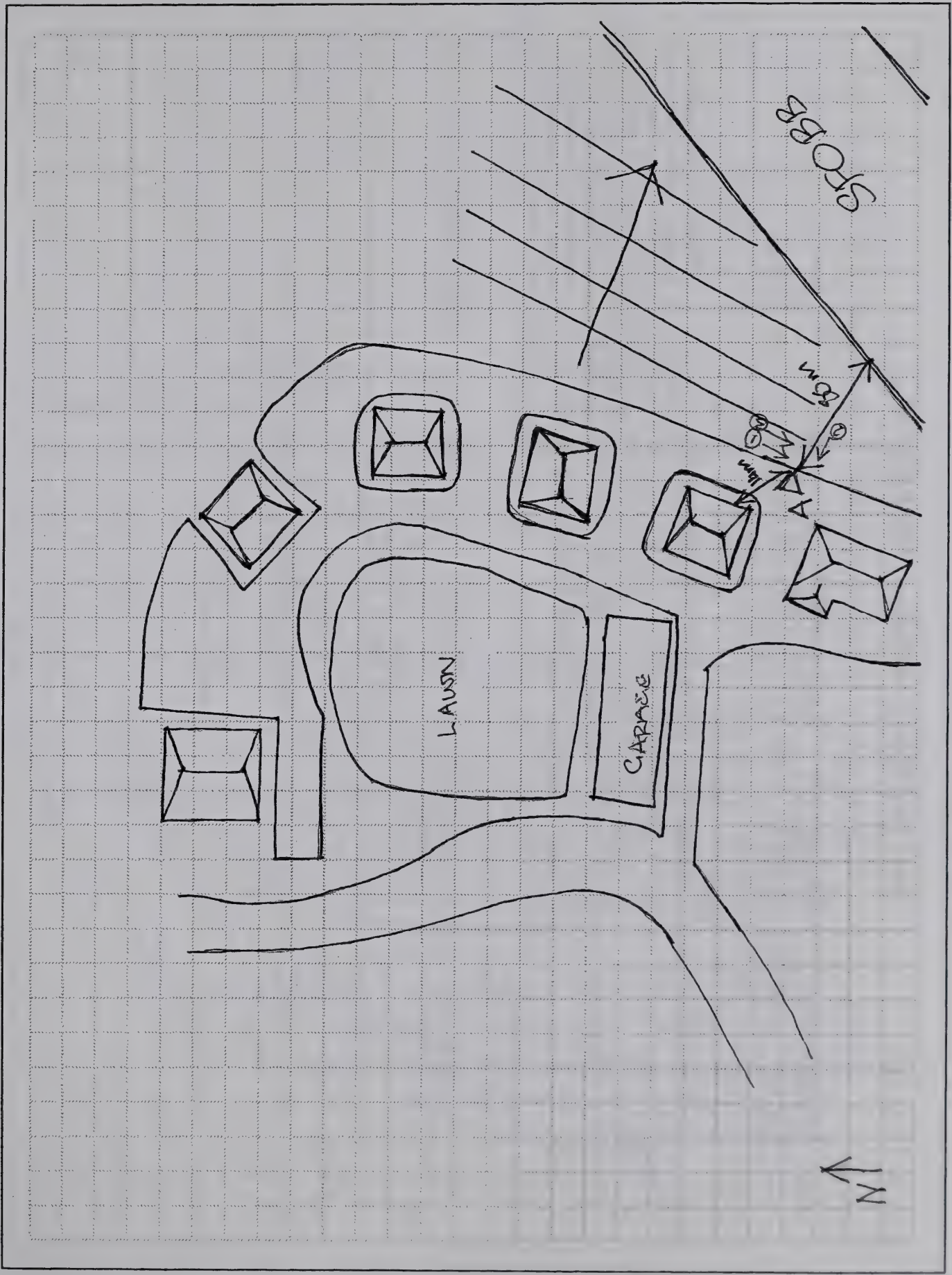
228	6-Apr-10	0:00:00	00:00.0	63.04	71.04	61.84	56.57
229	6-Apr-10	1:00:00	00:00.0	62.59	71.51	61.58	56.54
230	6-Apr-10	2:00:00	00:00.0	64.54	71.74	63.63	58.72
231	6-Apr-10	3:00:00	00:00.0	68.13	74.71	67.61	63.21
232	6-Apr-10	4:00:00	00:00.0	71.97	76.44	71.94	68.76
233	6-Apr-10	5:00:00	00:00.0	73.1	76.42	73.04	71.4
234	6-Apr-10	6:00:00	00:00.0	72.38	76.05	72.27	70.42
235	6-Apr-10	7:00:00	00:00.0	71.87	76.1	71.77	70.03
236	6-Apr-10	8:00:00	00:00.0	72.05	78.36	71.95	70.04
237	6-Apr-10	9:00:00	00:00.0	71.78	75.3	71.71	70.01
238	6-Apr-10	10:00:00	00:00.0	71.58	76.75	71.45	69.43
239	6-Apr-10	11:00:00	00:00.0	71.24	75.1	71.17	68.97
240	6-Apr-10	12:00:00	00:00.0	71.74	78.27	71.61	69.33
241	6-Apr-10	13:00:00	00:00.0	71.66	76.42	71.55	69.27
242	6-Apr-10	14:00:00	00:00.0	71.43	75.51	71.37	68.99
243	6-Apr-10	15:00:00	00:00.0	71.01	75.76	71.26	64.09
244	6-Apr-10	16:00:00	00:00.0	62.64	74.36	61.84	59.11
245	6-Apr-10	17:00:00	00:00.0	68.24	75.68	64.76	60.65
246	6-Apr-10	18:00:00	00:00.0	70.47	75.25	70.32	67.54
247	6-Apr-10	19:00:00	00:00.0	69.34	77.15	69.11	66.17
248	6-Apr-10	20:00:00	00:00.0	69.15	74.35	68.83	65.58
249	6-Apr-10	21:00:00	00:00.0	68.64	74.22	68.26	64.68
250	6-Apr-10	22:00:00	00:00.0	66.57	78.56	66.02	61.15
251	6-Apr-10	23:00:00	00:00.0	64.31	73.65	63.17	57.6



Wind: 10 mph

**Notes:**

Traffic noise from Bay Bridge dominant. Construction yard nearby but few movements of equipment & vehicles



# Short Term Noise Level Measurement Datasheet

Project: 08080090.11 Date: 4/1/09 Analyst: MJP SLM: 824 Cal #: \_\_\_\_\_  
 Offset A: -46.53 Offset B: -46.53 Temp: 63°F Hum: 86% Wind: 14 mph

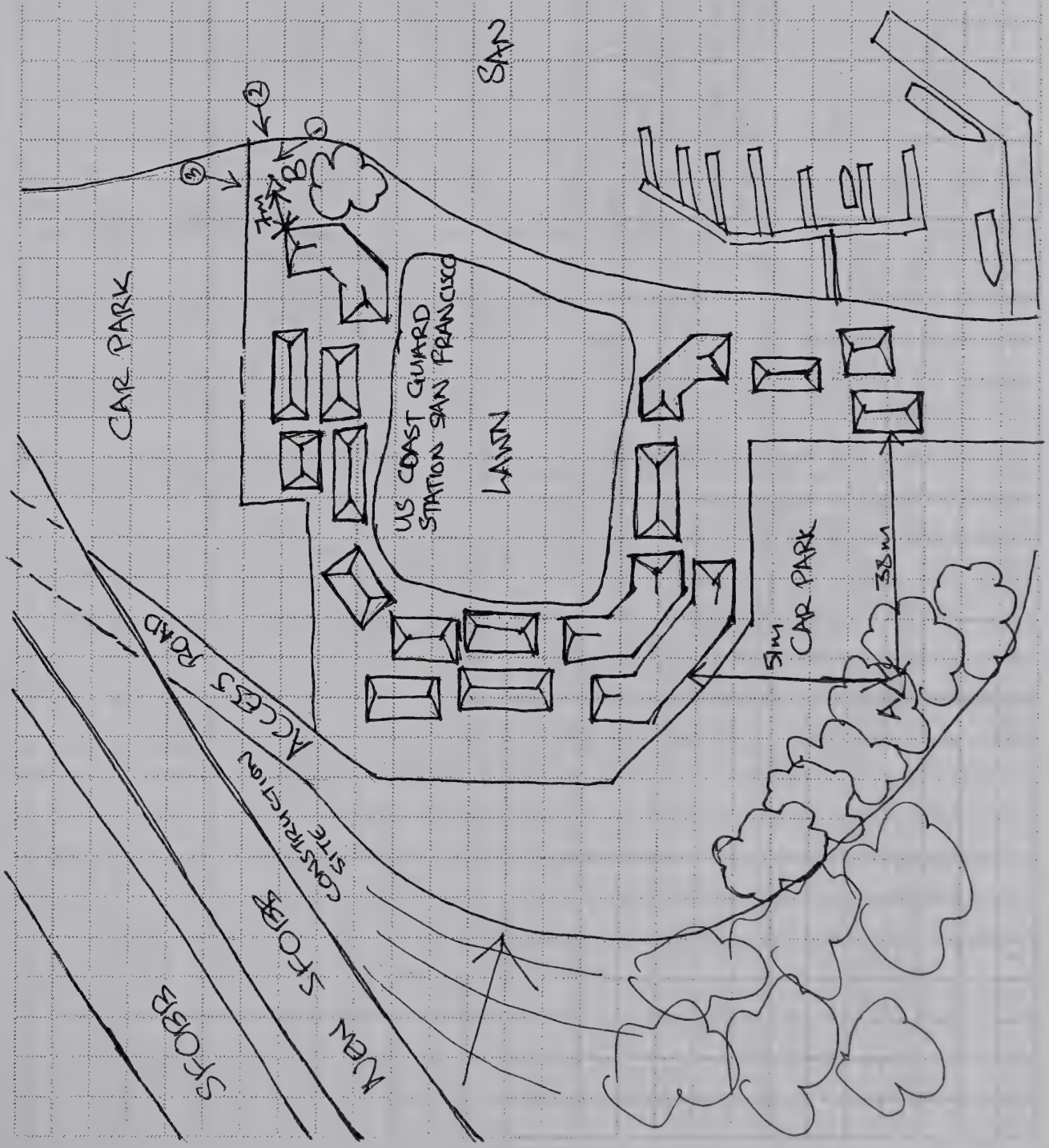
Site	Location	Time	Leq	Lmax	L10	L50	L90	Notes:
3	A	12:16	64.9	74.5	—	64.3	63.0	File no. 5: Bay Bridge traffic dominant 1x helicopter fly over; commercial jet flyovers audible; building HVAC plant nearby but not operating; power tools on base audible
	B	12:42	70.4	75	71.0	70.3	68.9	Bridge traffic dominant; construction audible but irregular - hand tools, no major equipment File no. 6-11

ST-2

ST-3



SAN FRANCISCO BAY



Short Term Noise Level Measurement Datasheet

Project: 0808090.11 Date: 4/1/09 Analyst: MJP SLM: 824 Cal #:           
 Offset A: -46.43 Offset B: -46.44 Temp: 63°F Hum: 86% Wind: 19 mph

Site	Location	Time	Leq	Lmax	L10	L50	L90	Notes:
5	A	15:16 to 15:31	60.5	64.6	61.5	60.3	59.0	File 62: Bay Bridge traffic noise dominates construction noise audible; Bird song.
	B	15:41 to 15:56	57.9	65.3	58.8	57.6	57.0	File 7: Bay Bridge traffic noise dominates; 4x Aircraft overflights, ships horns audible.

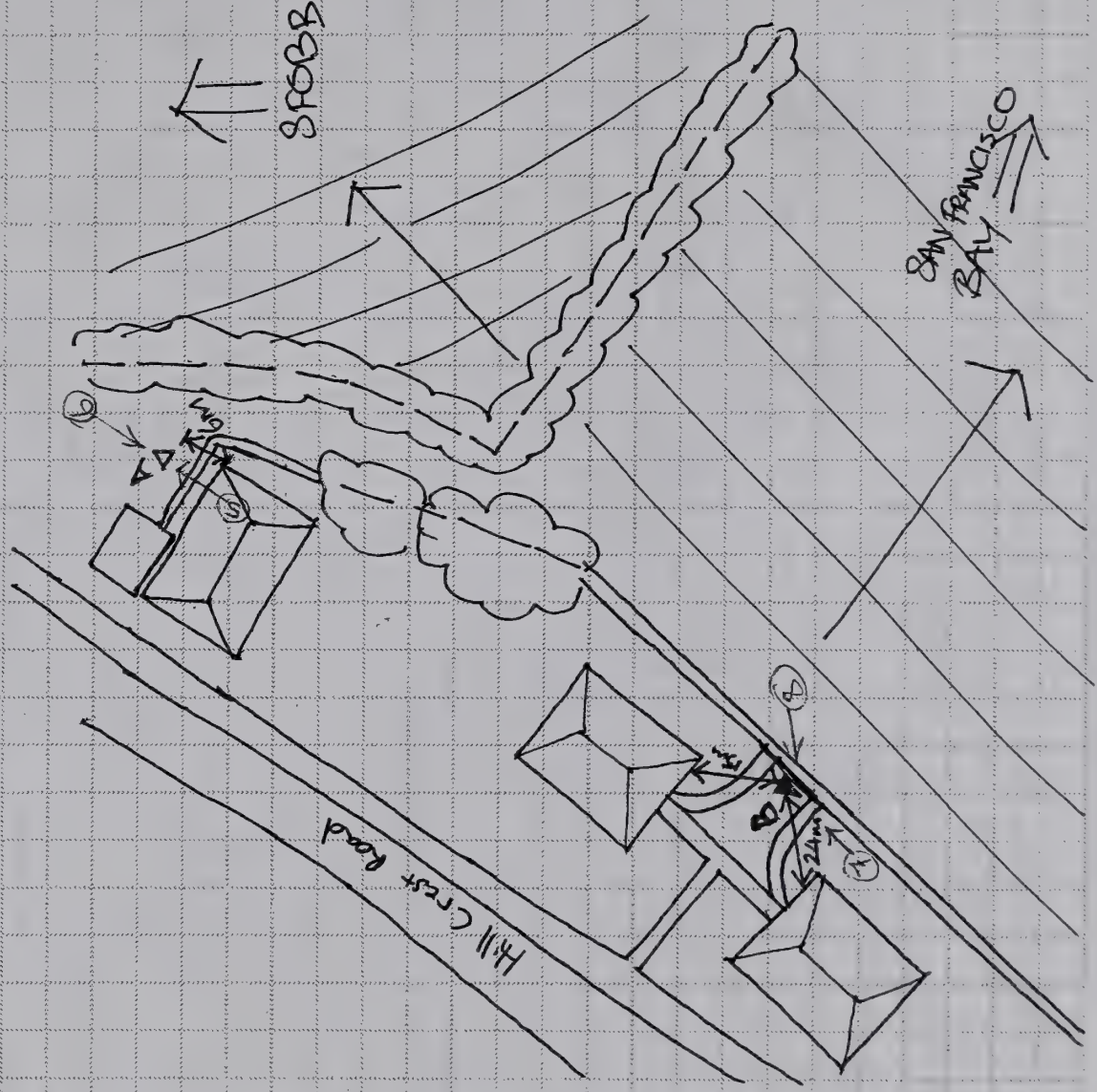
ST-4

ST-5



SAN FRANCISCO  
BAY

SPORB





# Continuous Noise Measurement Datasheet

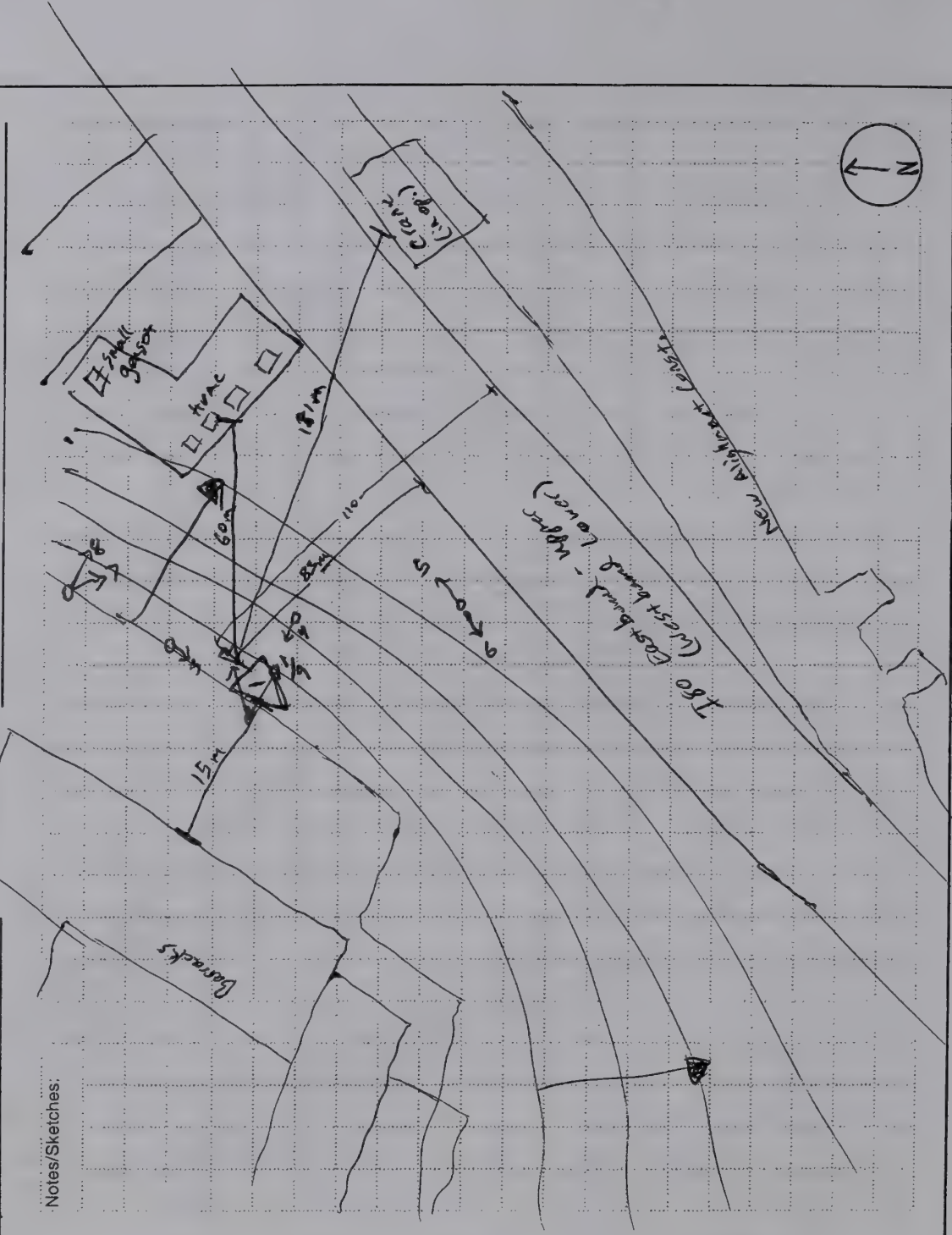
Project: 08080090.11 Date: 03/27/09 Analyst: MJC SLM: 1-  
 Cal #: 1- Offset A: 8.6 Offset B: 8.5 Temp: 69.1 Hum: 40.7% Wind: 0-3 mph Sky: Clear  
 Roadway Name: SFOB-B-I-80 Location-On Site: \_\_\_\_\_

Notes/Sketches:

Site: I-80  
 Start Time: 11:18 A  
 Stop Time: \_\_\_\_\_  
 Mile Elev ~ Source: 720'  
 Ground Type: Soft  
 Site Topography: Sloped toward Road.

Noise Source(s) w/ Distance:  
 1) I-80 Upper: 83m-110m  
 I-80 Lower: 85m-112m  
 Construction: 181m  
 Substation: 60m

Notes: 1) Freeway dominant.  
 2) pressure release valve for crane operation  
 3) Aircraft flyover



## Continuous Noise Measurement Datasheet

Project: 06080090.11 Date: 03/27/09 Analyst: MJC SLM: 2-  
 Cal #: 2- Offset A: 5.7 Offset B: 75.88 Temp: 5.7 Hum: 38.7% Wind: 2-3 Sky: CLL  
 Roadway Name: I-80 SF08B3 Location On Site: \_\_\_\_\_

Site: LI-2Start Time: 12:20pmStop Time: 11:00am

Mic Elev - Source: \_\_\_\_\_

Ground Type: Soft/RealSite Topography: Sloped to

Support Structure: \_\_\_\_\_

Noise Source(s) w/ Distance:

- 1) Traffic on Bay Bridge  
- Grounds maintenance  
on wed 4/1/09

-mower-sprinkler-vehiclesNotes: -Birdsong

Notes/Sketches:



*CONTINUOUS*  
**FHWA Traffic Noise Model Calibration Datasheet**

Project: 0808090.11 Date: 23/27/09 Analyst: MY SLM: 4-  
 Cal #: 4- Offset A: 6.7 Offset B: 6.7 Temp: 78.2 F Hum: 35% Wind: 0-3 mph Sky: CLR  
 Roadway Name: I80 SF0BB Location On Site: Site 3

Site: LT-3

Car #: \_\_\_\_\_

Start Time: 3:40

Duration: \_\_\_\_\_

Auto: ☒Med: ☒Hvy: ☒Leg: ☒

Lmax: \_\_\_\_\_

Distance to CL: 170 mMic Elev ~ Road: -100'Number of Lanes: 5-6Posted Speed: 55

Observed Speed: \_\_\_\_\_

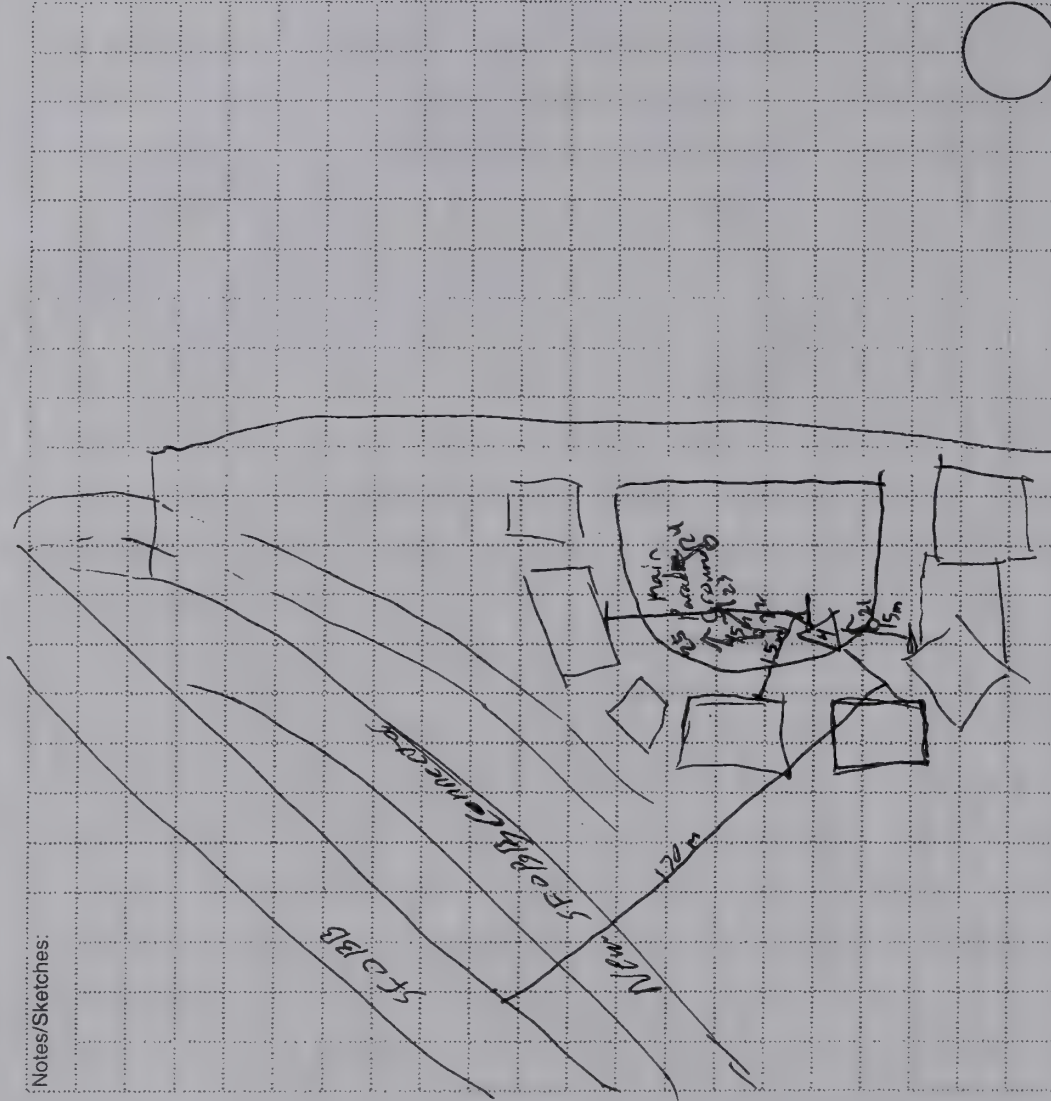
Road Type: \_\_\_\_\_

Road Grade: \_\_\_\_\_

Road Condition: \_\_\_\_\_

Intv. Ground Type: SoftSite Topography: Flat

Notes/Sketches:



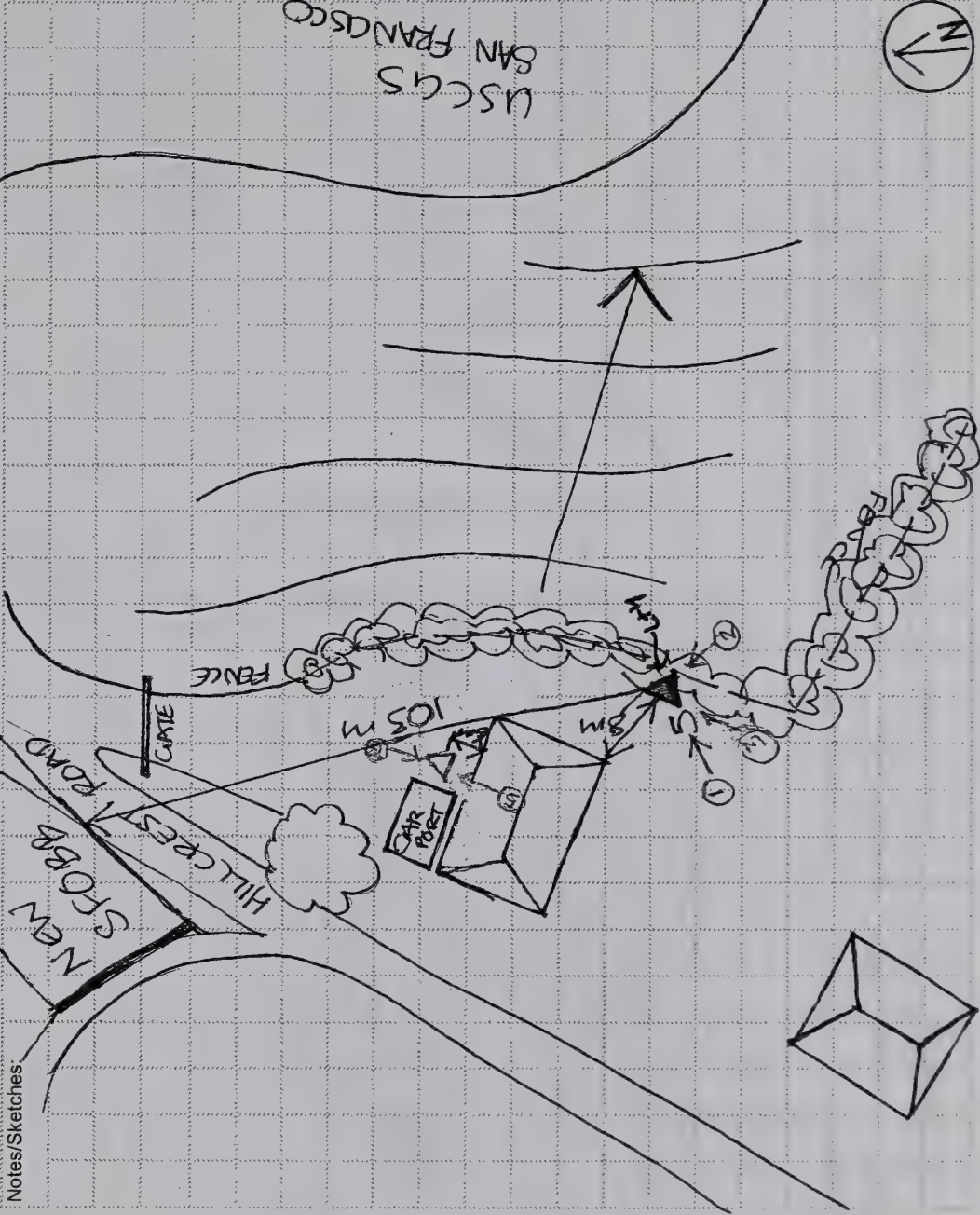


# Continuous Noise Measurement Datasheet

Project: 0808090-11 Date: 4/1/09 Analyst: MJP SLM: #2

Cal #: 2 Offset A: 5.7 Offset B: 5.8 Temp: 62°F Hum: 83% Wind: 19 mph Sky: CLR

Roadway Name: I-80 SFOBB Location On Site: on fence line



Site: LT-4

Start Time: 14:00

Stop Time: 16:00

Mic Elev ~ Source: ~10m

Ground Type: short grass

Site Topography: Hilly

Noise Source(s) w/ Distance:

1) Bay Bridge traffic dominates.

2) Construction noise from SFOBB upgrade project audible - reversing beepers.

Notes: 3) Birdsong minor contributor.

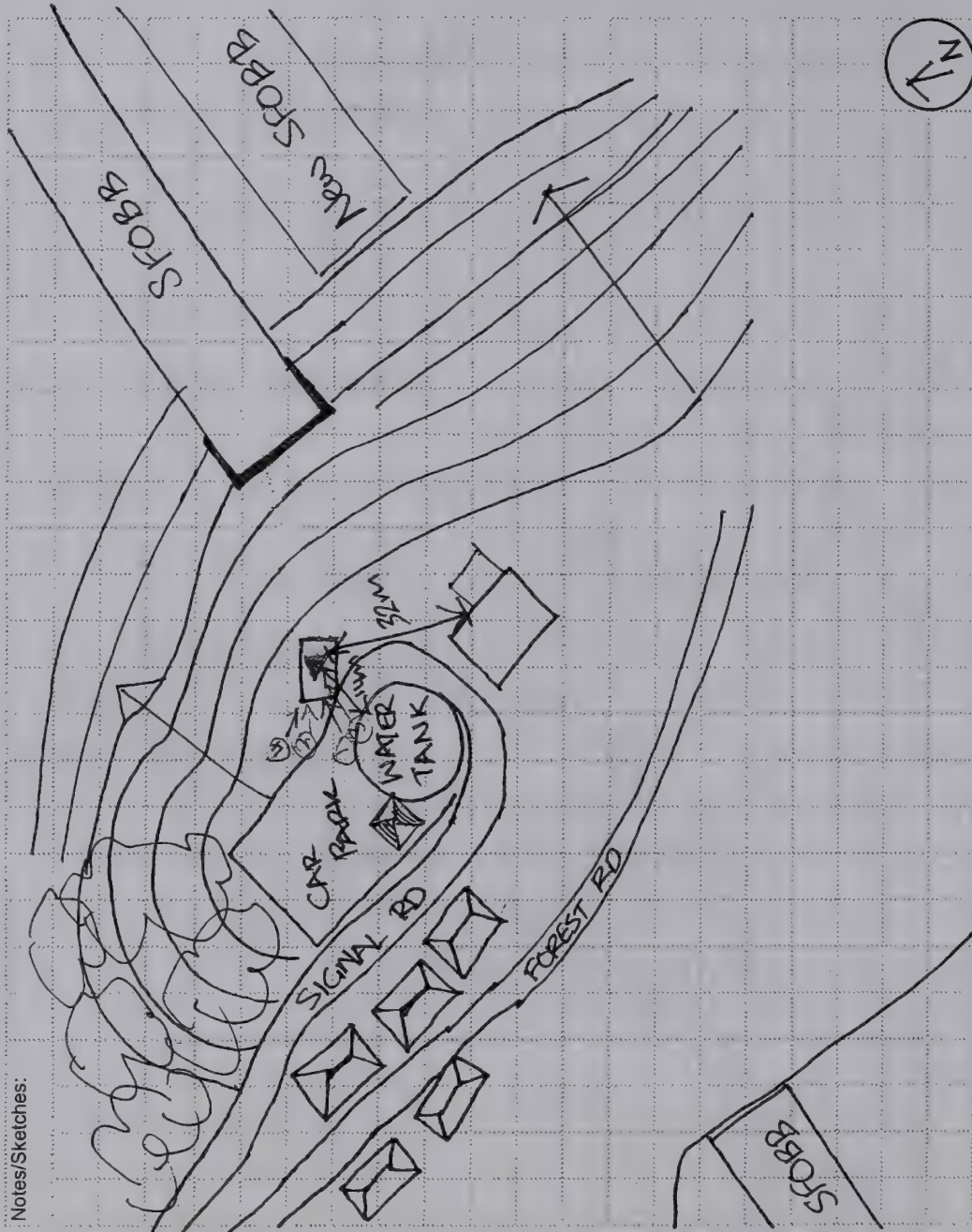
Continuous Noise Measurement Datasheet

Project: 0808090.11 Date: 4/3/09 Analyst: 4/3/09 SLM: #14  
 Cal #: 4 Offset A: 6.7 Offset B: 6.6 Temp: 63°F Hum: 72% Wind: 7 mph Sky: CLR  
 Roadway Name: I-80 SFOB Location On Site: on top of flat roof

Site: LT-5  
 Start Time: 14:00  
 Stop Time: 14:00  
 Mic Elev ~ Source: 55m  
 Ground Type: Soil w/ vegetation  
 Site Topography: Hilly

Noise Source(s) w/ Distance:  
 1) Traffic noise from eastern SFOB eliminates.  
 2) Occasional traffic on Signal Rd access to car park.  
 3) Aircraft overflights  
 Notes: 4) Bird song  
 5) Cars on local roads.

Notes/Sketches:



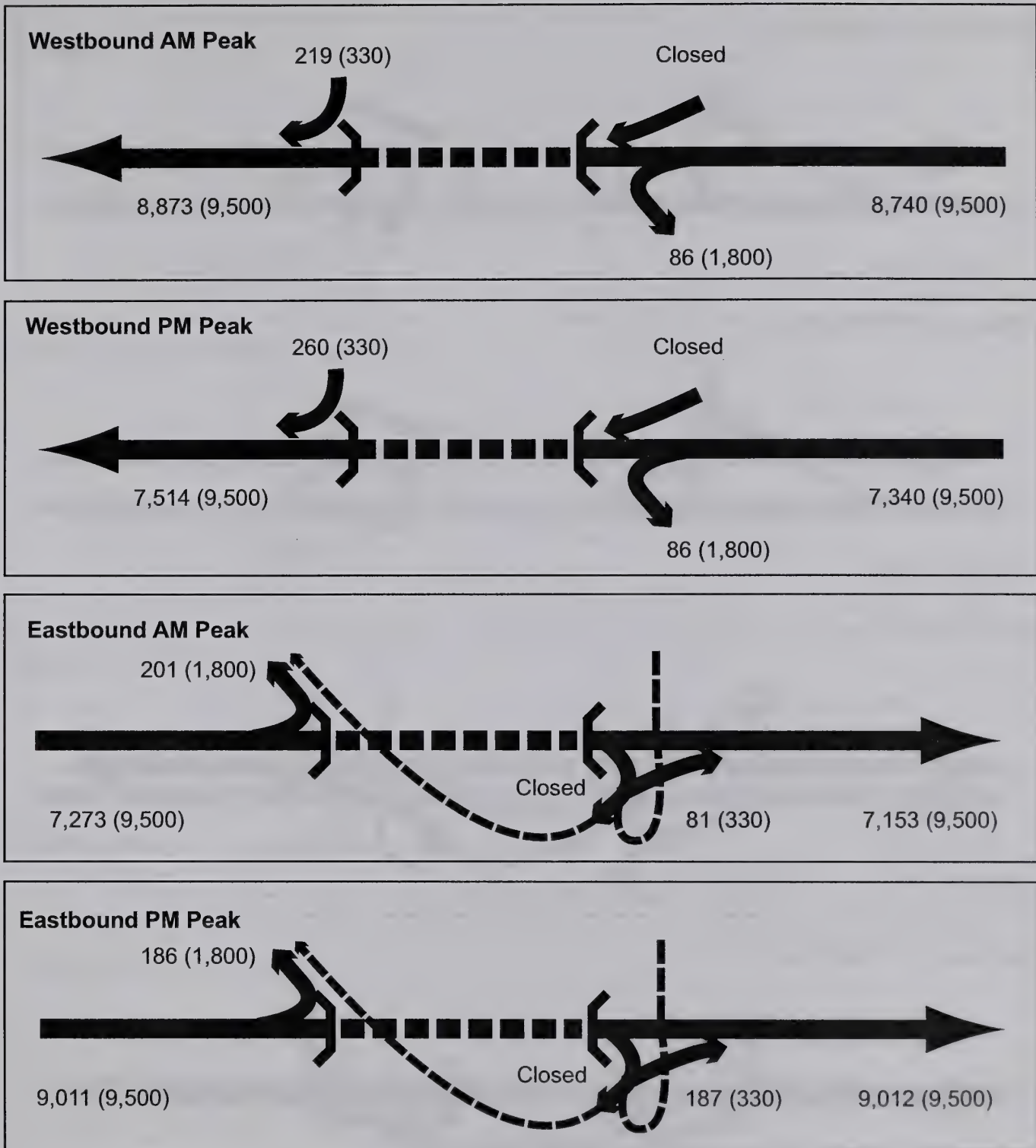
## **APPENDIX B**

### **TRAFFIC DATA USED IN NOISE MODELING**





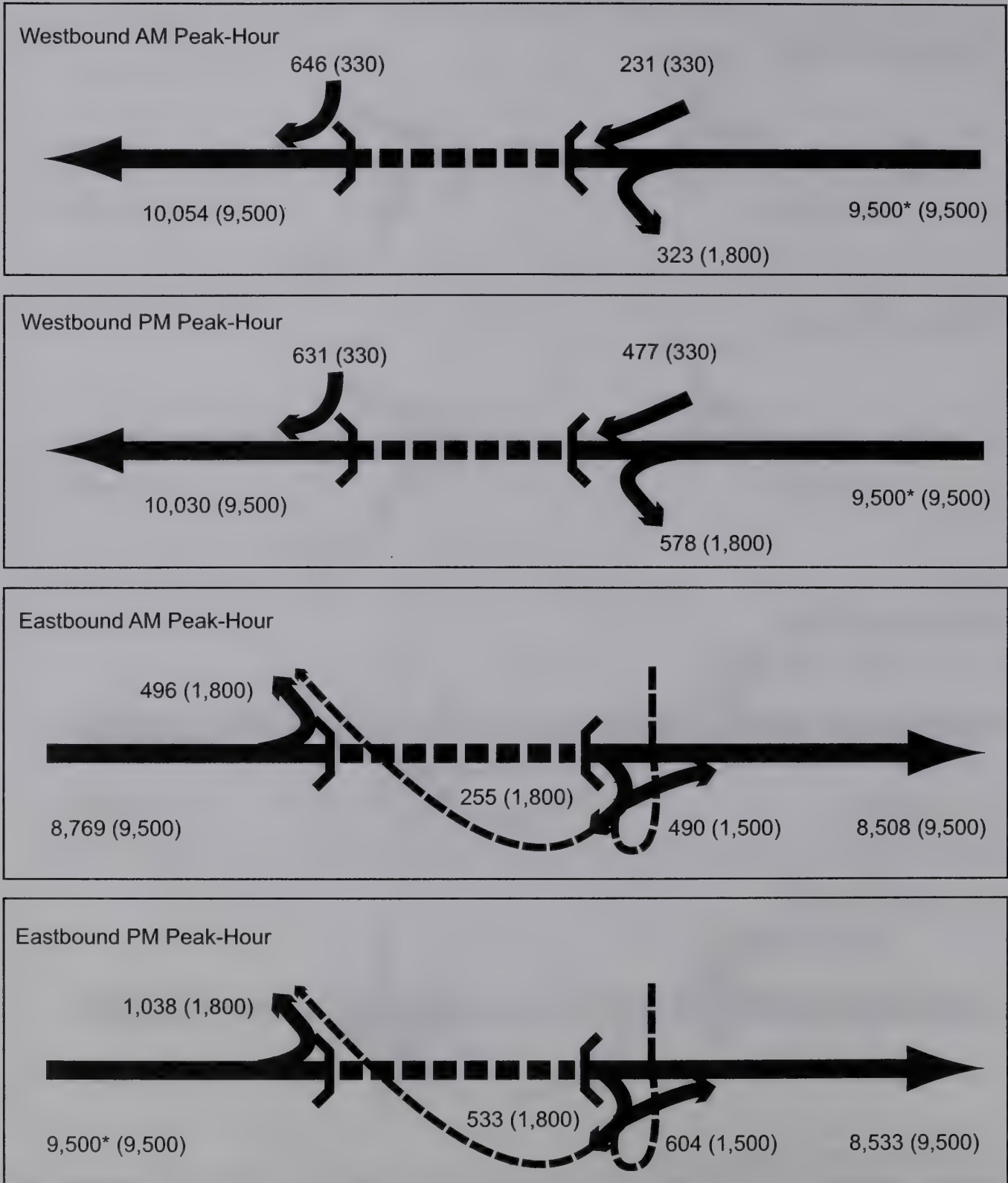
## Existing (2008) Peak-Hour Volume



1. The volume and capacity are shown as xx (yy).
2. Bay Bridge westbound traffic volumes are controlled by metering lights during both the AM and PM peak periods, and Caltrans sets a limit of 9,600 vehicles per hour onto the Bay Bridge.
3. Bay Bridge eastbound capacity is constrained by the ramps and mainline configuration near First Street. The highest volume counted between 2005 and 2007 was approximately 9,500 vehicles per hour.



## Future (2035) No Build



1. The demand volume and capacity are shown as xx (yy).

2. In future scenario, there would be 4 bus trips to San Francisco and 9 bus trips from Oakland.

\* Constrained Volumes



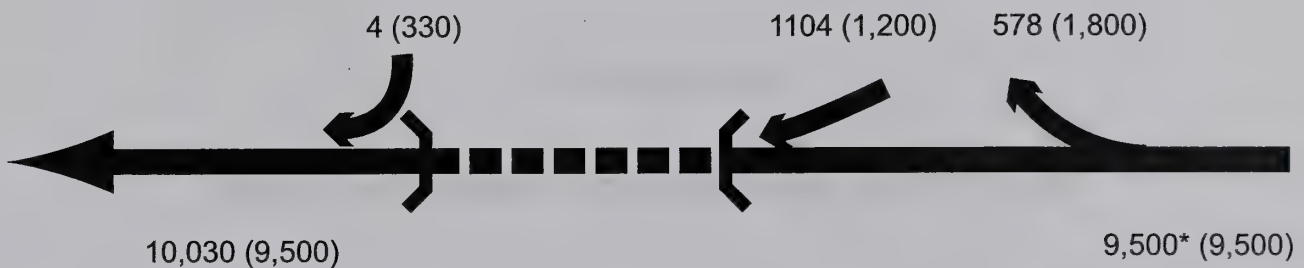


## Future (2035) Build

### Westbound AM Peak-Hour



### Westbound PM Peak-Hour



### Eastbound AM Peak-Hour



### Eastbound PM Peak-Hour



1. The demand volume and capacity are shown as xx (yy).

2. In future scenario, there would be 4 bus trips to San Francisco and 9 bus trips from Oakland.

\* Constrained Volumes



## **APPENDIX C**

### **NOISE LEVEL ADJUSTMENTS AND K-FACTORS**





**Noise Measurement and TNM  
Validation/Adjustment Summary**

Location	Leq	Adjustment	Adj Leq	Modeled	Delta (K-Factor)
ST-1	70.4	1	71.4	67.2	4.2
ST-2	64.9	1	65.9	65.7	0.2
ST-3	70.4	1	71.4	65.7	5.7
ST-4	60.5	3	63.5	65.5	-2
ST-5	57.9	2	59.9	60.9	-1

## **APPENDIX D**

### **FHWA TNM 2.5 INPUT AND OUTPUT DATA**





## **APPENDIX D**

### **FHWA TNM 2.5 INPUT AND OUTPUT DATA**



INPUT: ROADWAYS

Yerba Buena Island 08080090.11

EDAW/AECOM

Mike Carr SN 65282

13 August 2009

TNM 2.5

INPUT: ROADWAYS

Average pavement type shall be used unless  
a State highway agency substantiates the use  
of a different type with the approval of FHWA

Yerba Buena Island 08080090.11

PROJECT/CONTRACT:

RUN: Existing

Roadway Name		Points										
Name	Width	Name	No.	Coordinates (pavement)		Flow Control			Segment			
				X	Y	Z	Control Device	Speed Constraint	Percent Vehicles Affected	Pvmt Type	On Struct?	
	m			m	m	m				%		
SFOBB WB - 1	7.3	point25		1	1,418.5	918.6	67.50				Average	Y
		point23		2	1,298.8	872.7	66.00				Average	Y
		point22		3	1,253.8	854.8	65.60				Average	Y
		point21		4	1,220.1	839.4	65.20				Average	Y
		point20		5	1,186.6	821.1	64.70				Average	Y
		point507		6	1,162.5	806.5	64.20				Average	Y
		point19		7	1,129.8	783.9	63.70				Average	Y
		point18		8	1,110.3	767.6	63.20				Average	Y
		point17		9	1,087.8	745.9	62.50				Average	Y
		point16		10	1,068.4	725.3	62.00				Average	Y
		point14		11	1,052.7	707.3	61.50				Average	Y
		point13		12	1,032.1	684.1	61.00				Average	Y
		point12		13	1,014.4	664.1	60.00				Average	Y
		point11		14	996.8	644.3	60.00				Average	Y
		point10		15	978.1	623.3	59.50				Average	Y
		point9		16	960.1	603.1	59.00				Average	Y
		point8		17	940.8	581.0	58.50				Average	Y
		point7		18	921.0	558.4	58.00				Average	Y
		point6		19	901.9	537.0	57.50				Average	Y
		point5		20	883.1	515.8	57.00				Average	Y
		point4		21	865.0	495.4	56.50				Average	Y
		point3		22	853.9	482.7	56.20				Average	Y
		point2		23	845.8	473.6	56.00					
		point48		24	1,419.0	912.6	67.50				Average	Y
		point47		25	1,300.7	867.3	66.00				Average	Y
SFOBB WB - 2	7.3											



			point46	26	1,257.6	850.7	65.60	Average	Y
			point45	27	1,223.3	836.1	65.20	Average	Y
			point44	28	1,189.8	818.8	64.70	Average	Y
			point43	29	1,165.7	803.9	64.20	Average	Y
			point42	30	1,133.5	780.4	63.70	Average	Y
			point41	31	1,114.9	764.7	63.20	Average	Y
			point40	32	1,092.1	742.8	62.50	Average	Y
			point39	33	1,073.3	722.6	62.00	Average	Y
			point38	34	1,057.6	704.6	61.50	Average	Y
			point37	35	1,036.9	681.2	61.00	Average	Y
			point36	36	1,018.8	660.8	60.00	Average	Y
			point35	37	1,001.0	640.7	60.00	Average	Y
			point34	38	983.1	620.5	59.50	Average	Y
			point33	39	964.5	599.6	59.00	Average	Y
			point32	40	945.8	578.4	58.50	Average	Y
			point31	41	925.9	555.9	58.00	Average	Y
			point30	42	906.8	534.3	57.50	Average	Y
			point29	43	888.7	514.0	57.00	Average	Y
			point28	44	869.5	492.8	56.50	Average	Y
			point27	45	858.6	479.9	56.20	Average	Y
			point26	46	849.5	469.7	56.00		
SFOBB WB - 3	7.3		point71	47	1,422.4	908.8	67.50	Average	Y
			point70	48	1,304.2	863.5	66.00	Average	Y
			point69	49	1,261.0	846.9	65.60	Average	Y
			point68	50	1,226.7	832.3	65.20	Average	Y
			point67	51	1,193.2	814.9	64.70	Average	Y
			point66	52	1,168.1	799.3	64.20	Average	Y
			point65	53	1,137.0	776.5	63.70	Average	Y
			point64	54	1,118.3	760.8	63.20	Average	Y
			point63	55	1,095.5	739.0	62.50	Average	Y
			point62	56	1,076.7	718.8	62.00	Average	Y
			point61	57	1,061.0	700.8	61.50	Average	Y
			point60	58	1,040.3	677.4	61.00	Average	Y
			point59	59	1,022.2	657.0	60.00	Average	Y
			point58	60	1,004.5	636.9	60.00	Average	Y
			point57	61	986.5	616.7	59.50	Average	Y
			point56	62	968.0	595.7	59.00	Average	Y
			point55	63	949.2	574.6	58.50	Average	Y
			point54	64	929.3	552.1	58.00	Average	Y

## INPUT: ROADWAYS

Yerba Buena Island 08080090.11

		point53	65	910.3	530.5	57.50			Average	Y
		point52	66	892.2	510.2	57.00			Average	Y
		point51	67	873.0	488.9	56.50			Average	Y
		point50	68	862.0	476.1	56.20			Average	Y
		point49	69	853.0	465.9	56.00				
SFOBB WB OFF SE	3.7	point82	70	970.0	595.0	58.00			Average	
		point81	71	894.5	509.8	57.00			Average	
		point80	72	884.6	498.2	57.00			Average	
		point79	73	884.0	493.9	57.00			Average	
		point78	74	885.1	490.1	57.00			Average	
		point77	75	887.5	487.3	57.00			Average	
		point76	76	899.1	483.8	57.00			Average	
		point75	77	914.4	479.1	57.00			Average	
		point74	78	929.8	473.0	56.50			Average	
		point73	79	943.5	465.6	56.00				
SFOBB EB OFF SE	3.7	point96	80	886.6	496.7	58.00			Average	
		point95	81	919.4	524.9	51.20			Average	
		point94	82	925.7	530.1	51.30			Average	
		point93	83	946.1	550.2	51.50			Average	
		point92	84	949.8	552.6	51.50			Average	
		point91	85	952.0	553.6	51.50			Average	
		point90	86	958.8	555.0	51.50			Average	
		point89	87	963.5	554.4	51.20			Average	
		point88	88	966.9	553.3	51.00			Average	
		point87	89	970.1	551.7	50.80			Average	
		point86	90	977.5	545.3	50.50			Average	
		point85	91	979.9	542.2	50.00			Average	
		point84	92	982.5	534.0	49.50			Average	
		point83	93	986.4	520.0	48.00				
SFOBB WB ON NE	3.7	point106	94	954.5	634.9	47.50	Onramp	72.00	100	Average
		point105	95	883.6	554.9	56.50			Average	
		point104	96	880.6	550.8	56.80			Average	
		point103	97	879.5	546.3	57.00			Average	
		point102	98	877.6	528.5	57.00			Average	
		point101	99	875.6	521.9	57.00			Average	
		point100	100	873.2	516.6	57.00			Average	
		point99	101	862.9	501.7	56.70			Average	
		point98	102	848.8	481.8	56.50			Average	
		point97	103	843.6	475.0	56.00			Average	

INPUT: ROADWAYS

Yerba Buena Island 08080090.11

SFOBB WB OFF NE	3.7	point123	104	1,030.7	686.0	52.00			Average
		point122	105	1,013.1	666.1	52.00			Average
		point121	106	995.7	646.5	52.00			Average
		point120	107	958.4	607.9	51.80			Average
		point119	108	919.5	564.6	51.50			Average
		point118	109	900.4	542.3	51.30			Average
		point117	110	893.2	535.8	51.10			Average
		point116	111	889.0	534.8	51.00			Average
		point115	112	885.7	535.6	51.50			Average
		point114	113	883.1	538.5	52.00			Average
		point113	114	882.2	543.8	53.00			Average
		point112	115	883.3	548.8	54.00			Average
		point111	116	886.3	554.1	55.00			Average
		point107	117	956.5	633.8	47.50			
SFOBB EB ON SE	3.7	point137	118	988.1	521.8	48.00	Onramp	0.00	100
		point136	119	984.2	536.2	49.50			Average
		point135	120	980.5	547.6	50.50			Average
		point134	121	976.7	558.8	51.00			Average
		point133	122	974.1	567.2	51.50			Average
		point132	123	973.6	572.5	51.50			Average
		point131	124	974.0	578.1	51.40			Average
		point130	125	974.6	580.7	51.40			Average
		point129	126	975.7	584.7	51.30			Average
		point128	127	981.1	597.1	51.40			Average
		point127	128	987.9	608.4	51.50			Average
		point126	129	995.6	619.1	51.70			Average
		point125	130	1,008.7	635.6	51.90			Average
		point124	131	1,018.4	646.7	52.00			
Forest Rd - 1	3.7	point370	132	623.6	468.2	92.00			Average
		point369	133	624.3	463.0	92.50			Average
		point368	134	629.2	458.1	92.00			Average
		point367	135	639.7	452.1	91.00			Average
		point366	136	653.3	443.1	90.50			Average
		point365	137	657.8	439.3	90.00			Average
		point364	138	673.3	420.0	90.00			Average
		point363	139	678.0	415.8	90.00			Average
		point362	140	693.7	404.9	90.00			Average
		point361	141	712.9	394.2	91.00			Average
		point360	142	731.8	386.5	90.00			



Forest Rd - 2	3.7	point371	143	732.6	388.4	90.00			Average
		point372	144	713.7	396.1	91.00			Average
		point373	145	694.7	406.6	90.00			Average
		point374	146	679.3	417.4	90.00			Average
		point375	147	674.7	421.4	90.00			Average
		point376	148	659.2	440.7	90.00			Average
		point377	149	654.5	444.7	90.50			Average
		point378	150	640.8	453.8	90.00			Average
		point379	151	630.4	459.7	92.00			Average
		point380	152	626.2	463.9	92.50			Average
		point381	153	625.6	468.5	92.00			
Signal Rd - 1	3.7	point394	154	628.6	466.7	92.00			Average
		point393	155	641.6	461.7	91.50			Average
		point392	156	668.2	456.6	94.50			Average
		point391	157	674.0	454.2	94.80			Average
		point390	158	708.1	430.4	98.00			Average
		point389	159	752.6	412.0	99.50			Average
		point388	160	762.9	408.4	100.20			Average
		point387	161	777.7	407.1	101.50			Average
		point386	162	789.1	412.5	102.50			Average
		point385	163	792.9	422.4	103.00			Average
		point384	164	789.3	432.7	103.20			Average
		point383	165	781.8	439.0	103.50			Average
		point382	166	764.6	441.0	103.80			
Signal Rd - 2	3.7	point406	167	764.6	438.7	103.80			Average
		point405	168	781.7	436.9	103.50			Average
		point404	169	787.9	431.6	103.20			Average
		point403	170	790.4	422.7	103.00			Average
		point402	171	786.8	414.4	102.50			Average
		point401	172	777.5	410.1	101.50			Average
		point400	173	762.9	411.2	100.20			Average
		point399	174	708.5	432.8	98.00			Average
		point398	175	675.4	456.1	94.80			Average
		point397	176	668.9	458.7	94.50			Average
		point396	177	641.9	463.8	91.50			Average
		point395	178	629.9	468.6	92.00			
SFOBB EB - 1	7.3	point513	179	845.8	473.6	50.00			Average
		point514	180	853.9	482.7	50.20			Average
		point515	181	865.0	495.4	50.50			Average

		point516	182	883.1	515.8	51.00			Average	Y
		point517	183	901.9	537.0	51.50			Average	Y
		point518	184	921.0	558.4	52.00			Average	Y
		point519	185	940.8	581.0	52.50			Average	Y
		point520	186	960.1	603.1	53.00			Average	Y
		point521	187	978.1	623.3	53.50			Average	Y
		point522	188	996.8	644.3	54.00			Average	Y
		point523	189	1,014.4	664.1	54.00			Average	Y
		point524	190	1,032.1	684.1	55.00			Average	Y
		point525	191	1,052.7	707.3	55.50			Average	Y
		point526	192	1,068.4	725.3	56.00			Average	Y
		point527	193	1,087.8	745.9	56.50			Average	Y
		point528	194	1,110.3	767.6	57.20			Average	Y
		point529	195	1,129.8	783.9	57.70			Average	Y
		point530	196	1,162.5	806.5	58.20			Average	Y
		point531	197	1,186.6	821.1	58.70			Average	Y
		point532	198	1,220.1	839.4	59.20			Average	Y
		point533	199	1,253.8	854.8	59.60			Average	Y
		point534	200	1,298.8	872.7	60.00			Average	Y
		point536	201	1,418.5	918.6	61.50				
SFOBB EB - 2	7.3	point537	202	849.5	469.7	50.00			Average	Y
		point538	203	858.6	479.9	50.20			Average	Y
		point539	204	869.5	492.8	50.50			Average	Y
		point540	205	888.7	514.0	51.00			Average	Y
		point541	206	906.8	534.3	51.50			Average	Y
		point542	207	925.9	555.9	52.00			Average	Y
		point543	208	945.8	578.4	52.50			Average	Y
		point544	209	964.5	599.6	53.00			Average	Y
		point545	210	983.1	620.5	53.50			Average	Y
		point546	211	1,001.0	640.7	54.00			Average	Y
		point547	212	1,018.8	660.8	54.00			Average	Y
		point548	213	1,036.9	681.2	55.00			Average	Y
		point549	214	1,057.6	704.6	55.50			Average	Y
		point550	215	1,073.3	722.6	56.00			Average	Y
		point551	216	1,092.1	742.8	56.50			Average	Y
		point552	217	1,114.9	764.7	57.20			Average	Y
		point553	218	1,133.5	780.4	57.70			Average	Y
		point554	219	1,165.7	803.9	58.20			Average	Y
		point555	220	1,189.8	818.8	58.70			Average	Y

			point556	221	1,223.3	836.1	59.20		Average	Y
			point557	222	1,257.6	850.7	59.60		Average	Y
			point558	223	1,300.7	867.3	60.00		Average	Y
			point559	224	1,419.0	912.6	61.50			
SFOBB EB - 3	7.3		point560	225	853.0	465.9	50.00		Average	Y
			point561	226	862.0	476.1	50.20		Average	Y
			point562	227	873.0	488.9	50.50		Average	Y
			point563	228	892.2	510.2	51.00		Average	Y
			point564	229	910.3	530.5	51.50		Average	Y
			point565	230	929.3	552.1	52.00		Average	Y
			point566	231	949.2	574.6	52.50		Average	Y
			point567	232	968.0	595.7	53.00		Average	Y
			point568	233	986.5	616.7	53.50		Average	Y
			point569	234	1,004.5	636.9	54.00		Average	Y
			point570	235	1,022.2	657.0	54.00		Average	Y
			point571	236	1,040.3	677.4	55.00		Average	Y
			point572	237	1,061.0	700.8	55.50		Average	Y
			point573	238	1,076.7	718.8	56.00		Average	Y
			point574	239	1,095.5	739.0	56.50		Average	Y
			point575	240	1,118.3	760.8	57.20		Average	Y
			point576	241	1,137.0	776.5	57.70		Average	Y
			point577	242	1,168.1	799.3	58.20		Average	Y
			point578	243	1,193.2	814.9	58.70		Average	Y
			point579	244	1,226.7	832.3	59.20		Average	Y
			point580	245	1,261.0	846.9	59.60		Average	Y
			point581	246	1,304.2	863.5	60.00		Average	Y
			point582	247	1,422.4	908.8	61.50			
North Gate Rd - 1	3.7		point359	248	1,124.1	467.5	3.50		Average	
			point358	249	1,111.4	473.9	4.00		Average	
			point357	250	1,098.7	489.2	4.50		Average	
			point356	251	1,089.0	516.7	5.00		Average	
			point355	252	1,081.7	537.9	5.40		Average	
			point354	253	1,073.4	555.5	5.60		Average	
			point353	254	1,070.6	565.0	5.80		Average	
			point352	255	1,070.8	576.7	5.70		Average	
			point351	256	1,074.8	593.1	5.50		Average	
			point350	257	1,085.1	615.7	4.00		Average	
			point349	258	1,095.2	630.9	3.50		Average	
			point348	259	1,107.1	644.5	3.50		Average	



		point347	260	1,111.6	649.3	3.50		Average
		point346	261	1,128.6	669.7	3.50		Average
		point345	262	1,137.6	681.0	3.50		Average
		point344	263	1,163.4	712.1	3.50		Average
		point343	264	1,182.9	735.2	4.00		Average
		point342	265	1,190.3	745.6	4.20		Average
		point341	266	1,195.2	752.6	4.50		Average
		point340	267	1,198.5	763.6	5.00		Average
		point339	268	1,197.7	770.3	5.50		Average
		point338	269	1,195.7	776.6	6.00		Average
		point337	270	1,188.6	784.5	6.50		Average
		point335	271	1,172.5	792.6	7.00		Average
		point334	272	1,142.9	805.1	8.60		Average
		point333	273	1,134.1	812.4	8.70		Average
		point332	274	1,120.5	831.3	8.80		Average
		point331	275	1,110.0	846.8	9.00		Average
		point330	276	1,100.5	860.4	9.10		Average
		point329	277	1,094.9	866.9	9.30		Average
		point328	278	1,089.0	870.5	9.30		Average
		point327	279	1,074.9	873.3	9.50		Average
		point326	280	1,058.3	874.8	10.00		Average
		point325	281	1,043.2	875.2	10.20		Average
		point324	282	1,028.0	874.8	10.50		Average
		point323	283	1,000.9	872.0	12.50		Average
		point322	284	965.5	867.9	15.00		Average
		point321	285	930.5	860.9	16.50		Average
		point320	286	910.8	850.2	18.00		Average
		point319	287	885.7	829.5	20.00		Average
		point318	288	876.1	814.3	21.50		Average
		point317	289	871.2	791.0	23.50		Average
		point316	290	873.5	776.2	25.50		Average
		point315	291	885.0	756.1	26.00		Average
		point314	292	894.1	744.9	26.50		Average
		point313	293	897.0	736.5	26.70		Average
		point312	294	890.0	728.2	28.00		Average
		point311	295	869.1	729.3	28.20		Average
		point310	296	838.6	726.6	30.20		Average
		point309	297	808.0	727.5	31.50		Average
		point308	298	797.1	724.0	32.30		Average

		point307	299	795.4	713.2	32.50			Average
		point306	300	801.7	704.8	32.80			Average
		point305	301	808.3	703.5	33.00			Average
		point304	302	837.9	709.9	34.50			Average
		point303	303	856.4	708.7	35.50			Average
		point302	304	875.3	703.6	36.50			Average
		point301	305	946.4	678.3	40.50			Average
		point300	306	967.0	665.8	42.50			Average
		point299	307	975.1	657.4	43.50			Average
		point298	308	975.4	649.8	44.80			
North Gate Rd - 2	3.7	point609	309	980.6	648.5	44.80			Average
		point241	310	978.9	658.9	43.50			Average
		point240	311	974.3	664.4	43.00			Average
		point239	312	968.3	668.3	42.00			Average
		point238	313	946.7	679.7	40.50			Average
		point237	314	920.0	690.1	38.50			Average
		point236	315	903.8	696.0	38.00			Average
		point235	316	874.7	706.7	36.50			Average
		point234	317	856.7	711.6	35.50			Average
		point233	318	837.9	712.7	34.50			Average
		point232	319	808.2	706.6	33.00			Average
		point231	320	802.6	707.5	32.80			Average
		point230	321	798.2	714.0	32.50			Average
		point229	322	799.2	722.3	32.80			Average
		point228	323	808.3	725.7	31.50			Average
		point227	324	838.9	724.6	30.20			Average
		point226	325	869.2	727.4	28.20			Average
		point225	326	891.3	726.1	28.00			Average
		point224	327	899.9	736.4	26.70			Average
		point223	328	896.7	745.8	26.50			Average
		point222	329	887.6	757.5	26.00			Average
		point221	330	875.8	776.9	25.50			Average
		point220	331	873.5	791.2	23.50			Average
		point219	332	878.3	813.9	21.50			Average
		point218	333	887.7	828.1	20.00			Average
		point217	334	912.6	848.7	18.00			Average
		point216	335	931.5	858.7	16.50			Average
		point215	336	966.3	865.7	15.00			Average
		point214	337	1,029.0	871.4	10.50			Average

		point213	338	1,059.1	870.7	10.00		Average
		point212	339	1,075.1	869.6	9.50		Average
		point211	340	1,088.1	866.9	9.30		Average
		point210	341	1,092.6	863.7	9.30		Average
		point209	342	1,105.7	847.3	9.00		Average
		point208	343	1,132.0	810.7	8.70		Average
		point207	344	1,140.5	802.3	8.60		Average
		point206	345	1,171.5	789.1	7.00		Average
		point205	346	1,185.8	782.0	6.50		Average
		point204	347	1,191.4	775.4	6.00		Average
		point203	348	1,192.7	771.5	5.50		Average
		point202	349	1,193.2	765.2	5.00		Average
		point201	350	1,191.2	756.4	4.50		Average
		point200	351	1,177.4	740.0	4.00		Average
		point199	352	1,167.8	727.2	3.60		Average
		point198	353	1,158.1	712.1	3.50		Average
		point197	354	1,092.8	633.7	3.50		Average
		point196	355	1,080.9	616.6	4.00		Average
		point195	356	1,070.5	593.7	5.50		Average
		point194	357	1,067.2	577.5	5.70		Average
		point193	358	1,066.7	564.7	5.80		Average
		point192	359	1,070.5	554.0	5.60		Average
		point191	360	1,079.2	537.3	5.40		Average
		point190	361	1,096.3	488.5	4.50		Average
		point189	362	1,109.6	471.9	4.00		Average
		point188	363	1,122.5	464.6	3.50		
Macalla Rd - 1	3.7	point608	364	975.4	649.8	44.80		Average
		point297	365	970.6	644.2	45.50		Average
		point296	366	963.7	642.0	46.00		Average
		point295	367	954.1	643.0	47.50		Average
		point294	368	909.2	655.7	52.00		Average
		point293	369	863.1	668.1	56.50		Average
		point292	370	851.7	668.3	57.50		Average
		point291	371	838.7	666.6	58.50		Average
		point290	372	822.7	661.3	59.50		Average
		point289	373	790.9	647.9	65.00		Average
		point288	374	781.7	638.5	66.00		Average
		point287	375	776.7	627.2	66.20		Average
		point286	376	775.1	615.1	66.50		Average



## INPUT: ROADWAYS

Yerba Buena Island 08080090.11

		point285	377	763.7	595.8	67.50			Average
		point284	378	749.0	584.6	68.50			Average
		point283	379	730.6	577.1	69.50			Average
		point282	380	711.5	575.6	70.00			Average
		point281	381	688.8	580.4	70.50			Average
		point280	382	671.1	587.3	71.00			Average
		point279	383	658.3	586.9	70.60			Average
		point278	384	635.8	585.6	70.30			Average
		point277	385	618.9	584.9	70.00			Average
		point276	386	610.5	587.9	68.50			Average
		point275	387	590.6	604.4	67.50			
Treasure Is Rd - 1	3.7	point164	388	985.1	519.1	48.00			Average
		point163	389	986.0	503.2	48.00			Average
		point162	390	984.4	452.2	53.50			Average
		point161	391	979.4	378.0	60.50			Average
		point160	392	975.4	356.4	61.50			Average
		point159	393	961.6	319.8	63.00			Average
		point158	394	950.8	306.7	63.50			Average
		point157	395	935.5	296.0	64.00			Average
		point156	396	921.7	290.2	64.00			Average
		point155	397	904.0	289.3	60.50			Average
		point154	398	896.6	291.0	60.80			Average
		point153	399	798.8	311.0	62.50			Average
		point152	400	776.7	316.4	62.20			Average
		point151	401	769.7	319.5	62.00			Average
		point150	402	728.3	352.1	71.50			Average
		point149	403	707.3	362.0	72.80			Average
		point148	404	694.4	363.4	74.00			Average
		point147	405	683.5	362.8	73.00			Average
		point146	406	671.9	360.6	72.50			Average
		point145	407	660.7	356.8	71.50			Average
		point144	408	654.9	355.4	70.00			Average
		point143	409	602.5	340.2	63.00			Average
		point142	410	591.8	337.9	62.00			Average
		point141	411	582.9	336.9	61.00			Average
		point140	412	571.6	337.4	60.00			Average
		point139	413	557.7	340.8	57.50			
Treasure Is Rd - 2-2	3.7	point663	414	556.4	336.6	57.50			Average
		point185	415	571.0	332.7	60.00			Average

		point184	416	583.3	332.3	61.00			Average
		point183	417	594.8	332.7	62.00			Average
		point182	418	664.7	354.5	71.00			Average
		point181	419	676.6	357.9	72.50			Average
		point180	420	686.6	359.0	73.00			Average
		point179	421	694.3	359.5	74.00			Average
		point178	422	706.9	358.4	72.80			Average
		point177	423	726.5	348.7	71.50			Average
		point176	424	767.9	316.6	62.00			Average
		point175	425	776.8	312.8	62.20			Average
		point174	426	904.5	285.9	60.00			Average
		point173	427	924.4	287.5	64.00			Average
		point172	428	940.3	294.3	64.00			Average
		point171	429	956.4	306.2	63.50			Average
		point170	430	966.8	319.1	63.00			Average
		point169	431	975.3	338.1	61.00			Average
		point168	432	980.9	359.6	61.50			Average
		point167	433	983.1	378.2	60.50			Average
		point166	434	990.1	506.3	48.50			Average
		point165	435	988.9	518.9	48.00			
Macalla Rd - 2	3.7	point1664	436	589.2	601.8	67.50			Average
		point262	437	608.9	584.9	68.50			Average
		point261	438	619.0	581.8	70.00			Average
		point260	439	649.0	583.5	71.00			Average
		point259	440	671.1	584.4	71.00			Average
		point258	441	687.7	577.3	70.50			Average
		point257	442	711.7	572.7	70.00			Average
		point256	443	731.9	574.3	69.50			Average
		point255	444	750.7	582.4	68.50			Average
		point254	445	765.5	593.8	67.50			Average
		point253	446	778.2	614.7	66.50			Average
		point252	447	780.7	627.7	66.20			Average
		point251	448	784.5	637.3	66.00			Average
		point250	449	792.7	645.2	65.00			Average
		point249	450	824.3	658.8	58.50			Average
		point248	451	840.9	664.0	58.50			Average
		point247	452	852.9	665.3	57.50			Average
		point246	453	862.9	665.1	56.50			Average
		point245	454	953.4	637.5	47.50			Average

INPUT: ROADWAYS

Yerba Buena Island 08080090.11

		point244	455	965.0	636.8	46.50		Average
		point243	456	974.6	640.0	45.50		Average
		point242	457	980.6	648.5	44.80		



EDAW/AECOM

13 August 2009

Mike Carr SN 65282

TNM 2.5

INPUT: TRAFFIC FOR LAeq1h Volumes

PROJECT/CONTRACT:

Yerba Buena Island 08080090.11

RUN:

Existing

Roadway Name	Points Name	No.	Segment Autos	MTrucks			HTTrucks			Buses			Motorcycles		
				V	S	km/h	V	S	km/h	V	S	km/h	V	S	km/h
				veh/hr	veh/hr	veh/hr	veh/hr	veh/hr	veh/hr	veh/hr	veh/hr	veh/hr	veh/hr	veh/hr	veh/hr
SFOBB WB - 1	point25	1	2829	105	37	105	45	88	0	0	0	0	0	0	0
	point23	2	2829	105	37	105	45	88	0	0	0	0	0	0	0
	point22	3	2829	105	37	105	45	88	0	0	0	0	0	0	0
	point21	4	2829	105	37	105	45	88	0	0	0	0	0	0	0
	point20	5	2829	105	37	105	45	88	0	0	0	0	0	0	0
	point507	6	2829	105	37	105	45	88	0	0	0	0	0	0	0
	point19	7	2829	105	37	105	45	88	0	0	0	0	0	0	0
	point18	8	2829	105	37	105	45	88	0	0	0	0	0	0	0
	point17	9	2829	105	37	105	45	88	0	0	0	0	0	0	0
	point16	10	2829	105	37	105	45	88	0	0	0	0	0	0	0
	point14	11	2829	105	37	105	45	88	0	0	0	0	0	0	0
	point13	12	2829	105	37	105	45	88	0	0	0	0	0	0	0
	point12	13	2829	105	37	105	45	88	0	0	0	0	0	0	0
	point11	14	2829	105	37	105	45	88	0	0	0	0	0	0	0
	point10	15	2829	105	37	105	45	88	0	0	0	0	0	0	0
	point9	16	2829	105	37	105	45	88	0	0	0	0	0	0	0
	point8	17	2829	105	37	105	45	88	0	0	0	0	0	0	0
	point7	18	2829	105	37	105	45	88	0	0	0	0	0	0	0
	point6	19	2829	105	37	105	45	88	0	0	0	0	0	0	0
	point5	20	2829	105	37	105	45	88	0	0	0	0	0	0	0
	point4	21	2829	105	37	105	45	88	0	0	0	0	0	0	0
	point3	22	2829	105	37	105	45	88	0	0	0	0	0	0	0
	point2	23													

SFOBB WB - 2	point48	24	2829	105	37	105	45	88	0	0	0
	point47	25	2829	105	37	105	45	88	0	0	0
	point46	26	2829	105	37	105	45	88	0	0	0
	point45	27	2829	105	37	105	45	88	0	0	0
	point44	28	2829	105	37	105	45	88	0	0	0
	point43	29	2829	105	37	105	45	88	0	0	0
	point42	30	2829	105	37	105	45	88	0	0	0
	point41	31	2829	105	37	105	45	88	0	0	0
	point40	32	2829	105	37	105	45	88	0	0	0
	point39	33	2829	105	37	105	45	88	0	0	0
	point38	34	2829	105	37	105	45	88	0	0	0
	point37	35	2829	105	37	105	45	88	0	0	0
	point36	36	2829	105	37	105	45	88	0	0	0
	point35	37	2829	105	37	105	45	88	0	0	0
	point34	38	2829	105	37	105	45	88	0	0	0
	point33	39	2829	105	37	105	45	88	0	0	0
	point32	40	2829	105	37	105	45	88	0	0	0
	point31	41	2829	105	37	105	45	88	0	0	0
	point30	42	2829	105	37	105	45	88	0	0	0
	point29	43	2829	105	37	105	45	88	0	0	0
	point28	44	2829	105	37	105	45	88	0	0	0
	point27	45	2829	105	37	105	45	88	0	0	0
	point26	46									
SFOBB WB - 3	point71	47	2829	105	37	105	45	88	0	0	0
	point70	48	2829	105	37	105	45	88	0	0	0
	point69	49	2829	105	37	105	45	88	0	0	0
	point68	50	2829	105	37	105	45	88	0	0	0
	point67	51	2829	105	37	105	45	88	0	0	0
	point66	52	2829	105	37	105	45	88	0	0	0
	point65	53	2829	105	37	105	45	88	0	0	0
	point64	54	2829	105	37	105	45	88	0	0	0
	point63	55	2829	105	37	105	45	88	0	0	0
	point62	56	2829	105	37	105	45	88	0	0	0
	point61	57	2829	105	37	105	45	88	0	0	0
	point60	58	2829	105	37	105	45	88	0	0	0
	point59	59	2829	105	37	105	45	88	0	0	0

INPUT: TRAFFIC FOR LAeq1h Volumes

Yerba Buena Island 08080090.11

	point58	60	2829	105	37	105	45	88	0	0	0
	point57	61	2829	105	37	105	45	88	0	0	0
	point56	62	2829	105	37	105	45	88	0	0	0
	point55	63	2829	105	37	105	45	88	0	0	0
	point54	64	2829	105	37	105	45	88	0	0	0
	point53	65	2829	105	37	105	45	88	0	0	0
	point52	66	2829	105	37	105	45	88	0	0	0
	point51	67	2829	105	37	105	45	88	0	0	0
	point50	68	2829	105	37	105	45	88	0	0	0
	point49	69									
SFOBB WB OFF SE	point82	70	84	88	1	88	1	88	0	0	0
	point81	71	84	88	1	88	1	88	0	0	0
	point80	72	84	88	1	88	1	88	0	0	0
	point79	73	84	88	1	88	1	88	0	0	0
	point78	74	84	88	1	88	1	88	0	0	0
	point77	75	84	88	1	88	1	88	0	0	0
	point76	76	84	88	1	88	1	88	0	0	0
	point75	77	84	88	1	88	1	88	0	0	0
	point74	78	84	88	1	88	1	88	0	0	0
	point73	79									
SFOBB EB OFF SE	point96	80	84	88	1	88	1	88	0	0	0
	point95	81	84	88	1	88	1	88	0	0	0
	point94	82	84	88	1	88	1	88	0	0	0
	point93	83	84	88	1	88	1	88	0	0	0
	point92	84	84	88	1	88	1	88	0	0	0
	point91	85	84	88	1	88	1	88	0	0	0
	point90	86	84	88	1	88	1	88	0	0	0
	point89	87	84	88	1	88	1	88	0	0	0
	point88	88	84	88	1	88	1	88	0	0	0
	point87	89	84	88	1	88	1	88	0	0	0
	point86	90	84	88	1	88	1	88	0	0	0
	point85	91	84	88	1	88	1	88	0	0	0
	point84	92	84	88	1	88	1	88	0	0	0
	point83	93									
SFOBB WB ON NE	point106	94	126	88	2	88	2	88	0	0	0
	point105	95	126	88	2	88	2	88	0	0	0



	point104	96	126	88	2	88	2	88	0	0	0	0
	point103	97	126	88	2	88	2	88	0	0	0	0
	point102	98	126	88	2	88	2	88	0	0	0	0
	point101	99	126	88	2	88	2	88	0	0	0	0
	point100	100	126	88	2	88	2	88	0	0	0	0
	point99	101	126	88	2	88	2	88	0	0	0	0
	point98	102	126	88	2	88	2	88	0	0	0	0
	point97	103										
SFOBB WB OFF NE	point123	104	126	65	2	65	2	65	0	0	0	0
	point122	105	126	65	2	65	2	65	0	0	0	0
	point121	106	126	65	2	65	2	65	0	0	0	0
	point120	107	126	65	2	65	2	65	0	0	0	0
	point119	108	126	65	2	65	2	65	0	0	0	0
	point118	109	126	65	2	65	2	65	0	0	0	0
	point117	110	126	65	2	65	2	65	0	0	0	0
	point116	111	126	65	2	65	2	65	0	0	0	0
	point115	112	126	65	2	65	2	65	0	0	0	0
	point114	113	126	65	2	65	2	65	0	0	0	0
	point113	114	126	65	2	65	2	65	0	0	0	0
	point112	115	126	65	2	65	2	65	0	0	0	0
	point111	116	126	65	2	65	2	65	0	0	0	0
	point107	117										
SFOBB EB ON SE	point137	118	79	88	1	88	1	88	0	0	0	0
	point136	119	79	88	1	88	1	88	0	0	0	0
	point135	120	79	88	1	88	1	88	0	0	0	0
	point134	121	79	88	1	88	1	88	0	0	0	0
	point133	122	79	88	1	88	1	88	0	0	0	0
	point132	123	79	88	1	88	1	88	0	0	0	0
	point131	124	79	88	1	88	1	88	0	0	0	0
	point130	125	79	88	1	88	1	88	0	0	0	0
	point129	126	79	88	1	88	1	88	0	0	0	0
	point128	127	79	88	1	88	1	88	0	0	0	0
	point127	128	79	88	1	88	1	88	0	0	0	0
	point126	129	79	88	1	88	1	88	0	0	0	0
	point125	130	79	88	1	88	1	88	0	0	0	0
	point124	131										



	point405	168	10	40	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	point404	169	10	40	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	point403	170	10	40	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	point402	171	10	40	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	point401	172	10	40	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	point400	173	10	40	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	point399	174	10	40	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	point398	175	10	40	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	point397	176	10	40	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	point396	177	10	40	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	point395	178																	
SFOBB EB - 1	point513	179	2315	105	31	105	38	88	0	0	0	0	0	0	0	0	0	0	0
	point514	180	2315	105	31	105	38	88	0	0	0	0	0	0	0	0	0	0	0
	point515	181	2315	105	31	105	38	88	0	0	0	0	0	0	0	0	0	0	0
	point516	182	2315	105	31	105	38	88	0	0	0	0	0	0	0	0	0	0	0
	point517	183	2315	105	31	105	38	88	0	0	0	0	0	0	0	0	0	0	0
	point518	184	2315	105	31	105	38	88	0	0	0	0	0	0	0	0	0	0	0
	point519	185	2315	105	31	105	38	88	0	0	0	0	0	0	0	0	0	0	0
	point520	186	2315	105	31	105	38	88	0	0	0	0	0	0	0	0	0	0	0
	point521	187	2315	105	31	105	38	88	0	0	0	0	0	0	0	0	0	0	0
	point522	188	2315	105	31	105	38	88	0	0	0	0	0	0	0	0	0	0	0
	point523	189	2315	105	31	105	38	88	0	0	0	0	0	0	0	0	0	0	0
	point524	190	2315	105	31	105	38	88	0	0	0	0	0	0	0	0	0	0	0
	point525	191	2315	105	31	105	38	88	0	0	0	0	0	0	0	0	0	0	0
	point526	192	2315	105	31	105	38	88	0	0	0	0	0	0	0	0	0	0	0
	point527	193	2315	105	31	105	38	88	0	0	0	0	0	0	0	0	0	0	0
	point528	194	2315	105	31	105	38	88	0	0	0	0	0	0	0	0	0	0	0
	point529	195	2315	105	31	105	38	88	0	0	0	0	0	0	0	0	0	0	0
	point530	196	2315	105	31	105	38	88	0	0	0	0	0	0	0	0	0	0	0
	point531	197	2315	105	31	105	38	88	0	0	0	0	0	0	0	0	0	0	0
	point532	198	2315	105	31	105	38	88	0	0	0	0	0	0	0	0	0	0	0
	point533	199	2315	105	31	105	38	88	0	0	0	0	0	0	0	0	0	0	0
	point534	200	2315	105	31	105	38	88	0	0	0	0	0	0	0	0	0	0	0
	point536	201																	
SFOBB EB - 2	point537	202	2315	105	31	105	38	88	0	0	0	0	0	0	0	0	0	0	0
	point538	203	2315	105	31	105	38	88	0	0	0	0	0	0	0	0	0	0	0



INPUT: TRAFFIC FOR LAeq1h Volumes

Yerba Buena Island 08080090.11

point539	204	2315	105	31	105	38	88	0	0	0
point540	205	2315	105	31	105	38	88	0	0	0
point541	206	2315	105	31	105	38	88	0	0	0
point542	207	2315	105	31	105	38	88	0	0	0
point543	208	2315	105	31	105	38	88	0	0	0
point544	209	2315	105	31	105	38	88	0	0	0
point545	210	2315	105	31	105	38	88	0	0	0
point546	211	2315	105	31	105	38	88	0	0	0
point547	212	2315	105	31	105	38	88	0	0	0
point548	213	2315	105	31	105	38	88	0	0	0
point549	214	2315	105	31	105	38	88	0	0	0
point550	215	2315	105	31	105	38	88	0	0	0
point551	216	2315	105	31	105	38	88	0	0	0
point552	217	2315	105	31	105	38	88	0	0	0
point553	218	2315	105	31	105	38	88	0	0	0
point554	219	2315	105	31	105	38	88	0	0	0
point555	220	2315	105	31	105	38	88	0	0	0
point556	221	2315	105	31	105	38	88	0	0	0
point557	222	2315	105	31	105	38	88	0	0	0
point558	223	2315	105	31	105	38	88	0	0	0
point559	224									
SFOBB EB - 3	225	2315	105	31	105	38	88	0	0	0
	226	2315	105	31	105	38	88	0	0	0
	227	2315	105	31	105	38	88	0	0	0
	228	2315	105	31	105	38	88	0	0	0
	229	2315	105	31	105	38	88	0	0	0
	230	2315	105	31	105	38	88	0	0	0
	231	2315	105	31	105	38	88	0	0	0
	232	2315	105	31	105	38	88	0	0	0
	233	2315	105	31	105	38	88	0	0	0
	234	2315	105	31	105	38	88	0	0	0
	235	2315	105	31	105	38	88	0	0	0
	236	2315	105	31	105	38	88	0	0	0
	237	2315	105	31	105	38	88	0	0	0
	238	2315	105	31	105	38	88	0	0	0
	239	2315	105	31	105	38	88	0	0	0

	point575	240	2315	105	31	105	38	88	0	0	0	0
	point576	241	2315	105	31	105	38	88	0	0	0	0
	point577	242	2315	105	31	105	38	88	0	0	0	0
	point578	243	2315	105	31	105	38	88	0	0	0	0
	point579	244	2315	105	31	105	38	88	0	0	0	0
	point580	245	2315	105	31	105	38	88	0	0	0	0
	point581	246	2315	105	31	105	38	88	0	0	0	0
	point582	247										
North Gate Rd - 1	point359	248	340	40	7	40	3	40	0	0	0	0
	point358	249	340	40	7	40	3	40	0	0	0	0
	point357	250	340	40	7	40	3	40	0	0	0	0
	point356	251	340	40	7	40	3	40	0	0	0	0
	point355	252	340	40	7	40	3	40	0	0	0	0
	point354	253	340	40	7	40	3	40	0	0	0	0
	point353	254	340	40	7	40	3	40	0	0	0	0
	point352	255	340	40	7	40	3	40	0	0	0	0
	point351	256	340	40	7	40	3	40	0	0	0	0
	point350	257	340	40	7	40	3	40	0	0	0	0
	point349	258	340	40	7	40	3	40	0	0	0	0
	point348	259	340	40	7	40	3	40	0	0	0	0
	point347	260	340	40	7	40	3	40	0	0	0	0
	point346	261	340	40	7	40	3	40	0	0	0	0
	point345	262	340	40	7	40	3	40	0	0	0	0
	point344	263	340	40	7	40	3	40	0	0	0	0
	point343	264	340	40	7	40	3	40	0	0	0	0
	point342	265	340	40	7	40	3	40	0	0	0	0
	point341	266	340	40	7	40	3	40	0	0	0	0
	point340	267	340	40	7	40	3	40	0	0	0	0
	point339	268	340	40	7	40	3	40	0	0	0	0
	point338	269	340	40	7	40	3	40	0	0	0	0
	point337	270	340	40	7	40	3	40	0	0	0	0
	point335	271	340	40	7	40	3	40	0	0	0	0
	point334	272	340	40	7	40	3	40	0	0	0	0
	point333	273	340	40	7	40	3	40	0	0	0	0
	point332	274	340	40	7	40	3	40	0	0	0	0
	point331	275	340	40	7	40	3	40	0	0	0	0

INPUT: TRAFFIC FOR LAeq1h Volumes

Yerba Buena Island 08080090.11

point330	276	340	40	7	40	3	40	0	0	0
point329	277	340	40	7	40	3	40	0	0	0
point328	278	340	40	7	40	3	40	0	0	0
point327	279	340	40	7	40	3	40	0	0	0
point326	280	340	40	7	40	3	40	0	0	0
point325	281	340	40	7	40	3	40	0	0	0
point324	282	340	40	7	40	3	40	0	0	0
point323	283	340	40	7	40	3	40	0	0	0
point322	284	340	40	7	40	3	40	0	0	0
point321	285	340	40	7	40	3	40	0	0	0
point320	286	340	40	7	40	3	40	0	0	0
point319	287	340	40	7	40	3	40	0	0	0
point318	288	340	40	7	40	3	40	0	0	0
point317	289	340	40	7	40	3	40	0	0	0
point316	290	340	40	7	40	3	40	0	0	0
point315	291	340	40	7	40	3	40	0	0	0
point314	292	340	40	7	40	3	40	0	0	0
point313	293	340	40	7	40	3	40	0	0	0
point312	294	340	40	7	40	3	40	0	0	0
point311	295	340	40	7	40	3	40	0	0	0
point310	296	340	40	7	40	3	40	0	0	0
point309	297	340	40	7	40	3	40	0	0	0
point308	298	340	40	7	40	3	40	0	0	0
point307	299	340	40	7	40	3	40	0	0	0
point306	300	340	40	7	40	3	40	0	0	0
point305	301	340	40	7	40	3	40	0	0	0
point304	302	340	40	7	40	3	40	0	0	0
point303	303	340	40	7	40	3	40	0	0	0
point302	304	340	40	7	40	3	40	0	0	0
point301	305	340	40	7	40	3	40	0	0	0
point300	306	340	40	7	40	3	40	0	0	0
point299	307	340	40	7	40	3	40	0	0	0
point298	308									
point609	309	340	40	7	40	3	40	0	0	0
point241	310	340	40	7	40	3	40	0	0	0
point240	311	340	40	7	40	3	40	0	0	0

North Gate Rd - 2



point239	312	340	40	7	40	3	40	0	0	0
point238	313	340	40	7	40	3	40	0	0	0
point237	314	340	40	7	40	3	40	0	0	0
point236	315	340	40	7	40	3	40	0	0	0
point235	316	340	40	7	40	3	40	0	0	0
point234	317	340	40	7	40	3	40	0	0	0
point233	318	340	40	7	40	3	40	0	0	0
point232	319	340	40	7	40	3	40	0	0	0
point231	320	340	40	7	40	3	40	0	0	0
point230	321	340	40	7	40	3	40	0	0	0
point229	322	340	40	7	40	3	40	0	0	0
point228	323	340	40	7	40	3	40	0	0	0
point227	324	340	40	7	40	3	40	0	0	0
point226	325	340	40	7	40	3	40	0	0	0
point225	326	340	40	7	40	3	40	0	0	0
point224	327	340	40	7	40	3	40	0	0	0
point223	328	340	40	7	40	3	40	0	0	0
point222	329	340	40	7	40	3	40	0	0	0
point221	330	340	40	7	40	3	40	0	0	0
point220	331	340	40	7	40	3	40	0	0	0
point219	332	340	40	7	40	3	40	0	0	0
point218	333	340	40	7	40	3	40	0	0	0
point217	334	340	40	7	40	3	40	0	0	0
point216	335	340	40	7	0	3	40	0	0	0
point215	336	340	40	7	40	3	40	0	0	0
point214	337	340	40	7	40	3	40	0	0	0
point213	338	340	40	7	40	3	40	0	0	0
point212	339	340	40	7	40	3	40	0	0	0
point211	340	340	40	7	40	3	40	0	0	0
point210	341	340	40	7	40	3	40	0	0	0
point209	342	340	40	7	40	3	40	0	0	0
point208	343	340	40	7	40	3	40	0	0	0
point207	344	340	40	7	40	3	40	0	0	0
point206	345	340	40	7	40	3	40	0	0	0
point205	346	340	40	7	40	3	40	0	0	0
point204	347	340	40	7	40	3	40	0	0	0

INPUT: TRAFFIC FOR LAeq1h Volumes

Yerba Buena Island 08080090.11

	point203	348	340	40	7	40	3	40	0	0	0
	point202	349	340	40	7	40	3	40	0	0	0
	point201	350	340	40	7	40	3	40	0	0	0
	point200	351	340	40	7	40	3	40	0	0	0
	point199	352	340	40	7	40	3	40	0	0	0
	point198	353	340	40	7	40	3	40	0	0	0
	point197	354	340	40	7	40	3	40	0	0	0
	point196	355	340	40	7	40	3	40	0	0	0
	point195	356	340	40	7	40	3	40	0	0	0
	point194	357	340	40	7	40	3	40	0	0	0
	point193	358	340	40	7	40	3	40	0	0	0
	point192	359	340	40	7	40	3	40	0	0	0
	point191	360	340	40	7	40	3	40	0	0	0
	point190	361	340	40	7	40	3	40	0	0	0
	point189	362	340	40	7	40	3	40	0	0	0
	point188	363									
Macalla Rd - 1	point608	364	340	40	7	40	3	40	0	0	0
	point297	365	340	40	7	40	3	40	0	0	0
	point296	366	340	40	7	40	3	40	0	0	0
	point295	367	340	40	7	40	3	40	0	0	0
	point294	368	340	40	7	40	3	40	0	0	0
	point293	369	340	40	7	40	3	40	0	0	0
	point292	370	340	40	7	40	3	40	0	0	0
	point291	371	340	40	7	40	3	40	0	0	0
	point290	372	340	40	7	40	3	40	0	0	0
	point289	373	340	40	7	40	3	40	0	0	0
	point288	374	340	40	7	40	3	40	0	0	0
	point287	375	340	40	7	40	3	40	0	0	0
	point286	376	340	40	7	40	3	40	0	0	0
	point285	377	340	40	7	40	3	40	0	0	0
	point284	378	340	40	7	40	3	40	0	0	0
	point283	379	340	40	7	40	3	40	0	0	0
	point282	380	340	40	7	40	3	40	0	0	0
	point281	381	340	40	7	40	3	40	0	0	0
	point280	382	340	40	7	40	3	40	0	0	0
	point279	383	340	40	7	40	3	40	0	0	0

INPUT: TRAFFIC FOR LAeq1h Volumes

Yerba Buena Island 08080090.11

	point278	384	340	40	7	40	3	40	0	0	0
	point277	385	340	40	7	40	3	40	0	0	0
	point276	386	340	40	7	40	3	40	0	0	0
	point275	387									
Treasure Is Rd - 1	point164	388	340	65	7	65	3	65	0	0	0
	point163	389	340	65	7	65	3	65	0	0	0
	point162	390	340	65	7	65	3	65	0	0	0
	point161	391	340	65	7	65	3	65	0	0	0
	point160	392	340	65	7	65	3	65	0	0	0
	point159	393	340	65	7	65	3	65	0	0	0
	point158	394	340	65	7	65	3	65	0	0	0
	point157	395	340	65	7	65	3	65	0	0	0
	point156	396	340	65	7	65	3	65	0	0	0
	point155	397	340	65	7	65	3	65	0	0	0
	point154	398	340	65	7	65	3	65	0	0	0
	point153	399	340	65	7	65	3	65	0	0	0
	point152	400	340	65	7	65	3	65	0	0	0
	point151	401	340	65	7	65	3	65	0	0	0
	point150	402	340	65	7	65	3	65	0	0	0
	point149	403	340	65	7	65	3	65	0	0	0
	point148	404	340	65	7	65	3	65	0	0	0
	point147	405	340	65	7	65	3	65	0	0	0
	point146	406	340	65	7	65	3	65	0	0	0
	point145	407	340	65	7	65	3	65	0	0	0
	point144	408	340	65	7	65	3	65	0	0	0
	point143	409	340	65	7	65	3	65	0	0	0
	point142	410	340	65	7	65	3	65	0	0	0
	point141	411	340	65	7	65	3	65	0	0	0
	point140	412	340	65	7	65	3	65	0	0	0
	point139	413									
Treasure Is Rd - 2-2	point663	414	340	65	7	65	3	65	0	0	0
	point185	415	340	65	7	65	3	65	0	0	0
	point184	416	340	65	7	65	3	65	0	0	0
	point183	417	340	65	7	65	3	65	0	0	0
	point182	418	340	65	7	65	3	65	0	0	0
	point181	419	340	65	7	65	3	65	0	0	0



INPUT: TRAFFIC FOR LAeq1h Volumes

Yerba Buena Island 08080090.11

	point180	420	340	65	7	65	3	65	0	0	0
	point179	421	340	65	7	65	3	65	0	0	0
	point178	422	340	65	7	65	3	65	0	0	0
	point177	423	340	65	7	65	3	65	0	0	0
	point176	424	340	65	7	65	3	65	0	0	0
	point175	425	340	65	7	65	3	65	0	0	0
	point174	426	340	65	7	65	3	65	0	0	0
	point173	427	340	65	7	65	3	65	0	0	0
	point172	428	340	65	7	65	3	65	0	0	0
	point171	429	340	65	7	65	3	65	0	0	0
	point170	430	340	65	7	65	3	65	0	0	0
	point169	431	340	65	7	65	3	65	0	0	0
	point168	432	340	65	7	65	3	65	0	0	0
	point167	433	340	65	7	65	3	65	0	0	0
	point166	434	340	65	7	65	3	65	0	0	0
	point165	435									
Macalla Rd - 2	point664	436	340	40	7	40	3	40	0	0	0
	point262	437	340	40	7	40	3	40	0	0	0
	point261	438	340	40	7	40	3	40	0	0	0
	point260	439	340	40	7	40	3	40	0	0	0
	point259	440	340	40	7	40	3	40	0	0	0
	point258	441	340	40	7	40	3	40	0	0	0
	point257	442	340	40	7	40	3	40	0	0	0
	point256	443	340	40	7	40	3	40	0	0	0
	point255	444	340	40	7	40	3	40	0	0	0
	point254	445	340	40	7	40	3	40	0	0	0
	point253	446	340	40	7	40	3	40	0	0	0
	point252	447	340	40	7	40	3	40	0	0	0
	point251	448	340	40	7	40	3	40	0	0	0
	point250	449	340	40	7	40	3	40	0	0	0
	point249	450	340	40	7	40	3	40	0	0	0
	point248	451	340	40	7	40	3	40	0	0	0
	point247	452	340	40	7	40	3	40	0	0	0
	point246	453	340	40	7	40	3	40	0	0	0
	point245	454	340	40	7	40	3	40	0	0	0
	point244	455	340	40	7	40	3	40	0	0	0

INPUT: TRAFFIC FOR LAeq1h Volumes

Yerba Buena Island 08080090.11

point243	456	340	40	7	40	3	40	0	0	0
point242	457									

INPUT: RECEIVERS

EDAW/AECOM

Mike Carr SN 65282

INPUT: RECEIVERS

PROJECT/CONTRACT:

RUN:

Yerba Buena Island 08080090.11

Existing

20 October 2009

TNM 2.5

Yerba Buena Island 08080090.11

Receiver											
Name	No.	#DUs	Coordinates (ground)			Height above Ground	Input Sound Levels and Criteria				Active in Calc.
			X	Y	Z		Existing LAeq1h	Impact Criteria		NR Goal	
								LAeq1h	Sub'l		
			m	m	m	m	dB	dB	dB	dB	
R-1	9	1	916.0	782.7	28.00	1.50	67.40	71	12.0	5.0	
R-2 (ST-1)	16	1	989.0	755.0	21.00	1.50	71.40	71	12.0	5.0	Y
R-3	17	1	855.5	618.7	64.00	1.50	71.40	66	12.0	5.0	Y
R-4 (ST-3)	18	1	1,163.1	658.2	2.80	1.50	71.40	71	12.0	5.0	Y
R-5	19	1	1,125.6	585.5	2.80	1.50	70.40	71	12.0	5.0	Y
R-6	20	1	1,132.2	636.9	2.70	1.50	0.00	66	12.0	5.0	
R-7	21	1	1,103.1	625.7	2.80	1.50	0.00	66	12.0	5.0	
R-8	22	1	1,095.9	589.2	2.80	1.50	0.00	66	12.0	5.0	
R-9	24	1	1,104.5	546.9	3.10	1.50	0.00	66	12.0	5.0	
R-10 (ST-2)	25	1	1,111.1	505.2	3.70	1.50	65.90	66	12.0	5.0	
R-11	38	1	1,020.4	431.5	46.00	1.50	0.00	66	12.0	5.0	
R-12 (ST-4)	39	1	1,022.0	456.0	45.00	1.50	63.50	66	12.0	5.0	
R-13 (ST-5)	40	1	1,021.2	379.7	45.00	1.50	60.90	71	12.0	5.0	
R-14	41	1	1,018.4	397.2	51.80	1.50	0.00	66	12.0	5.0	
R-15	42	1	1,020.0	357.1	52.20	1.50	0.00	66	12.0	5.0	
R-16	43	1	794.8	434.3	101.50	1.50	73.10	71	12.0	5.0	
R-17	59	1	719.3	596.8	66.70	1.50	0.00	66	12.0	5.0	
R-1 0											
R-2 (ST-1) 0											
R-3 0											
R-4 (ST-3) 0											
R-5 0											



**Yerba Buena Island 08080090.11**

R-6	0
R-7	0
R-8	0
R-9	0
R-10 (ST-2)	0
R-11	1
R-12 (ST-4)	0
R-13 (ST-5)	0
R-14	0
R-15	0
R-16	0

INPUT: BARRIERS

Yerba Buena Island 08080090.11

EDAW/AECOM  
Mike Carr SN 65282

13 August 2009  
TNM 2.5

INPUT: BARRIERS  
PROJECT/CONTRACT:  
RUN:

Yerba Buena Island 08080090.11  
Existing

Barrier										Points				Segment									
Barrier Name	Type	Height		Max	If Wall \$ per Unit Area	If Berm \$ per Unit Vol.	Top Width	Run:Rise	Add'ltnl \$ per Unit Length	Name	No.	Coordinates (bottom)			Height at Point		Segment		Important Reflec-tions?				
		Min	m									X	Y	m	Z	m	Point	Incre- ment		#Up #Dn	Struc- ture?		
Barrier1	W	0.00	30.48	0.00					0.00	point1	1	814.3	417.7	100.50	4.50	0.00	0	0					
										point2	2	820.7	399.2	100.50	4.50	0.00	0	0					
										point3	3	817.8	398.3	100.50	4.50	0.00	0	0					
										point4	4	819.5	383.0	100.50	4.50	0.00	0	0					
										point5	5	828.7	396.0	100.50	4.50	0.00	0	0					
										point6	6	827.9	398.5	100.50	4.50	0.00	0	0					
										point7	7	834.2	400.4	100.50	4.50	0.00	0	0					
										point8	8	834.4	399.5	100.50	4.50	0.00	0	0					
										point9	9	838.3	400.8	100.50	4.50	0.00	0	0					
										point10	10	837.2	404.2	100.50	4.50	0.00	0	0					
										point11	11	839.7	405.0	100.50	4.50	0.00	0	0					
										point12	12	834.5	421.0	100.50	4.50	0.00	0	0					
										point13	13	823.0	417.3	100.50	4.50	0.00	0	0					
										point14	14	821.9	420.4	100.50	4.50	0.00	0	0					
										point15	15	814.3	417.7	100.50	4.50								
Barrier2	W	0.00	30.48	0.00				0.00		point16	16	723.3	398.9	92.00	6.00	0.00	0	0					
										point17	17	717.0	401.9	92.00	6.00	0.00	0	0					
										point18	18	717.7	403.4	92.00	6.00	0.00	0	0					
										point19	19	708.9	407.5	92.00	6.00	0.00	0	0					
										point20	20	708.3	406.0	92.00	6.00	0.00	0	0					
										point21	21	701.9	409.0	92.00	6.00	0.00	0	0					
										point22	22	705.7	417.0	92.00	6.00	0.00	0	0					
										point23	23	707.2	416.2	92.00	6.00	0.00	0	0					
										point24	24	708.0	418.0	92.00	6.00	0.00	0	0					
										point25	25	726.3	409.4	92.00	6.00	0.00	0	0					
										point26	26	725.5	407.6	92.00	6.00	0.00	0	0					
										point27	27	727.0	406.9	92.00	6.00	0.00	0	0					
										point28	28	723.3	398.9	92.00	6.00								
									0.00	point29	29	680.1	423.5	92.00	6.00	0.00	0	0					
		Barrier3	W	0.00	30.48	0.00						point30	30	685.8	419.6	92.00	6.00	0.00	0	0			
										point31	31	686.7	420.8	92.00	6.00	0.00	0	0					
										point32	32	694.7	415.3	92.00	6.00	0.00	0	0					
										point33	33	693.9	414.1	92.00	6.00	0.00	0	0					
										point34	34	699.8	410.5	92.00	6.00	0.00	0	0					
										point35	35	704.4	417.4	92.00	6.00	0.00	0	0					

										point36	36	703.0	418.2	92.00	6.00	0.00	0	0
										point37	37	704.2	419.9	92.00	6.00	0.00	0	0
										point38	38	687.4	431.4	92.00	6.00	0.00	0	0
										point39	39	686.3	429.8	92.00	6.00	0.00	0	0
										point40	40	685.0	430.7	92.00	6.00	0.00	0	0
										point41	41	680.1	423.5	92.00	6.00			
									0.00	point42	42	662.2	446.1	92.00	6.00	0.00	0	0
										point43	43	666.2	440.5	92.00	6.00	0.00	0	0
										point44	44	667.5	441.4	92.00	6.00	0.00	0	0
										point45	45	673.2	433.5	92.00	6.00	0.00	0	0
										point46	46	672.0	432.6	92.00	6.00	0.00	0	0
										point47	47	676.1	427.3	92.00	6.00	0.00	0	0
										point48	48	683.0	432.2	92.00	6.00	0.00	0	0
										point49	49	682.0	433.4	92.00	6.00	0.00	0	0
										point50	50	683.6	434.6	92.00	6.00	0.00	0	0
										point51	51	671.7	451.1	92.00	6.00	0.00	0	0
										point52	52	670.2	449.9	92.00	6.00	0.00	0	0
										point53	53	669.3	451.2	92.00	6.00	0.00	0	0
										point54	54	662.2	446.1	92.00	6.00			
									0.00	point55	55	621.3	443.4	86.00	6.00	0.00	0	0
										point56	56	629.0	439.2	86.00	6.00	0.00	0	0
										point57	57	628.4	438.0	86.00	6.00	0.00	0	0
										point58	58	632.9	435.5	86.00	6.00	0.00	0	0
										point59	59	633.8	437.2	86.00	6.00	0.00	0	0
										point60	60	641.4	433.0	86.00	6.00	0.00	0	0
										point61	61	644.4	438.4	86.00	6.00	0.00	0	0
										point62	62	642.8	439.3	86.00	6.00	0.00	0	0
										point63	63	644.5	442.4	86.00	6.00	0.00	0	0
										point64	64	639.2	445.2	86.00	6.00	0.00	0	0
										point65	65	639.7	446.1	86.00	6.00	0.00	0	0
										point66	66	633.5	449.5	86.00	6.00	0.00	0	0
										point67	67	632.8	448.2	86.00	6.00	0.00	0	0
										point68	68	627.3	451.2	86.00	6.00	0.00	0	0
										point69	69	625.5	448.0	86.00	6.00	0.00	0	0
										point70	70	624.1	448.7	86.00	6.00	0.00	0	0
										point71	71	621.3	443.4	86.00	6.00			
									0.00	point72	72	645.1	431.4	86.00	6.00	0.00	0	0
										point73	73	650.5	424.6	86.00	6.00	0.00	0	0
										point74	74	649.2	423.6	86.00	6.00	0.00	0	0
										point75	75	652.4	419.6	86.00	6.00	0.00	0	0
										point76	76	653.6	420.6	86.00	6.00	0.00	0	0
										point77	77	659.0	413.7	86.00	6.00	0.00	0	0
										point78	78	663.7	417.4	86.00	6.00	0.00	0	0
										point79	79	662.8	418.6	86.00	6.00	0.00	0	0
										point80	80	665.5	420.8	86.00	6.00	0.00	0	0
										point81	81	661.8	425.5	86.00	6.00	0.00	0	0
										point82	82	663.0	426.4	86.00	6.00	0.00	0	0
										point83	83	658.5	432.1	86.00	6.00	0.00	0	0
										point84	84	658.0	431.7	86.00	6.00	0.00	0	0





















**Yerba Buena Island 08080090.11**

[illegible]

INPUT: TERRAIN LINES

EDAW/AECOM

Mike Carr SN 65282

13 August 2009

TNM 2.5

INPUT: TERRAIN LINES

PROJECT/CONTRACT:

Yerba Buena Island 08080090.11

RUN:

Existing

Terrain Line Name	Points			
	No.	Coordinates (ground)		
		X	Y	Z
		m	m	m
Terrain Line7	1	711.3	722.8	0.50
	2	708.4	693.7	10.00
	3	702.2	671.8	20.00
	4	697.4	656.0	30.00
	5	697.0	643.4	40.00
	6	698.4	633.3	50.00
	7	701.3	623.5	60.00
Terrain Line8	8	701.6	614.8	66.50
	9	693.8	610.9	67.00
	10	775.9	636.9	66.00
	11	776.0	652.2	60.00
	12	760.7	664.5	50.00
	13	749.2	666.9	40.00
	14	745.1	679.7	32.00
Terrain Line9	15	741.0	692.2	20.00
	16	736.4	708.9	10.00
	17	728.9	726.6	0.50
	18	793.5	779.6	0.50
	19	804.9	734.8	30.00
	20	891.8	737.7	26.50
	21	880.2	742.8	25.00
Terrain Line10	22	857.1	753.1	24.00
	23	849.0	763.4	14.00
	24	835.4	783.9	4.00



# INPUT: TERRAIN LINES

Yerba Buena Island 08080090.11

		25	835.0	795.2	0.50
Terrain Line11		26	855.1	809.6	0.50
		27	871.4	775.5	24.50
Terrain Line12		28	860.0	843.5	0.50
		29	880.1	821.7	20.00
Terrain Line13		30	882.2	862.6	0.50
		31	902.1	845.4	18.00
Terrain Line14		32	919.8	882.0	0.50
		33	927.1	861.2	16.00
Terrain Line15		34	940.8	864.0	16.00
		35	946.0	867.4	14.00
		36	949.1	881.7	8.00
		37	945.2	890.5	4.00
		38	937.9	894.6	0.50
Terrain Line16		39	968.5	886.1	0.50
		40	962.0	868.2	15.00
Terrain Line17		41	1,029.6	900.0	0.50
		42	1,031.9	878.5	12.00
Terrain Line19		43	927.7	853.3	18.00
		44	926.5	838.9	24.00
		45	926.7	832.6	25.50
Terrain Line20		46	959.6	860.0	15.50
		47	949.0	832.9	24.50
Terrain Line21		48	886.1	821.0	22.00
		49	888.6	814.3	24.00
		50	891.7	812.4	25.00
		51	898.1	806.1	26.00
Terrain Line22		52	880.7	778.3	26.00
		53	888.4	777.8	26.50
		54	889.8	777.7	27.50
		55	899.3	778.8	28.00
		56	912.4	784.1	29.00
Terrain Line23		57	900.8	756.4	26.00
		58	903.3	772.2	28.00
		59	913.2	783.0	29.00
Terrain Line24		60	915.3	796.2	26.00

INPUT: TERRAIN LINES

Yerba Buena Island 08080090.11

	61	909.5	798.3	26.50
Terrain Line25	62	923.4	816.5	25.50
	63	923.6	813.4	27.00
	64	920.9	806.0	28.50
Terrain Line26	65	942.4	802.0	23.50
	66	935.6	803.3	26.50
	67	924.8	803.3	29.00
Terrain Line27	68	956.2	754.4	22.50
	69	948.0	764.3	23.50
	70	920.0	791.6	28.50
Terrain Line28	71	948.3	789.6	22.50
	72	942.9	787.8	26.00
Terrain Line29	73	954.5	822.7	24.50
	74	968.2	849.7	18.00
	75	985.8	861.3	13.50
	76	999.7	860.6	12.00
	77	1,026.4	859.3	11.00
	78	1,055.7	857.9	10.00
	79	1,071.0	858.7	9.50
Terrain Line31	80	1,027.1	836.6	11.50
	81	1,027.0	825.3	12.30
	82	1,025.8	810.2	11.50
Terrain Line32	83	1,054.2	841.3	11.50
	84	1,048.9	825.2	14.50
	85	1,050.8	811.9	12.00
	86	1,057.4	801.8	13.50
	87	1,063.4	797.9	11.50
Terrain Line33	88	932.1	688.7	39.00
	89	956.4	742.7	21.50
	90	990.1	750.3	20.50
	91	1,026.9	772.0	12.50
	92	1,050.9	792.9	11.50
	93	1,057.4	801.8	13.50
	94	1,064.4	802.2	12.00
	95	1,074.7	807.4	11.50
Terrain Line34	96	966.2	674.6	40.00

## INPUT: TERRAIN LINES

Yerba Buena Island 08080090.11

	97	983.7	710.3	21.00
	98	1,004.9	721.9	20.00
	99	1,019.3	727.2	18.00
	100	1,042.4	744.5	12.50
Terrain Line35	101	1,017.7	792.0	12.50
	102	996.2	786.0	18.50
	103	987.8	784.8	19.50
	104	979.8	783.7	20.50
	105	975.4	779.9	21.00
Terrain Line36	106	856.1	611.5	65.00
	107	895.4	623.0	57.50
	108	914.7	642.0	54.00
	109	922.7	641.4	52.00
	110	931.7	640.2	50.00
	111	943.2	632.3	48.00
Terrain Line37	112	886.6	610.1	58.00
	113	901.9	613.2	55.00
Terrain Line38	114	859.1	594.6	64.00
	115	875.4	593.9	60.00
	116	887.3	593.4	58.50
	117	901.8	591.4	56.00
Terrain Line39	118	783.7	476.6	87.00
	119	782.5	486.0	86.00
	120	790.7	502.0	82.00
	121	813.2	518.4	74.00
	122	820.2	527.2	70.00
	123	868.0	552.1	61.50
	124	885.8	570.3	58.70
	125	902.3	588.3	56.00
	126	914.6	597.3	54.00
Terrain Line41	127	989.0	652.2	44.50
	128	1,023.8	691.7	21.00
	129	1,041.5	713.5	20.50
	130	1,054.8	727.5	12.50
	131	1,118.0	792.3	11.00
	132	1,130.9	800.0	10.00



INPUT: TERRAIN LINES

Yerba Buena Island 08080090.11

	133	1,136.6	803.3	9.00
Terrain Line46	134	793.0	430.2	103.00
	135	809.1	428.4	100.00
	136	827.3	439.8	89.00
	137	830.3	442.6	89.00
	138	838.8	456.3	72.00
	139	841.2	459.3	70.00
	140	838.5	469.1	69.00
Terrain Line47	141	782.1	440.8	103.50
	142	783.7	442.4	102.00
	143	797.3	470.1	88.00
	144	797.5	475.2	88.00
	145	804.3	488.2	80.00
	146	817.6	492.0	73.00
	147	829.5	495.4	66.00
	148	846.2	497.2	56.00
Terrain Line49	149	730.1	434.6	103.50
	150	708.8	445.6	100.00
	151	690.7	458.1	96.00
	152	674.2	481.7	90.00
	153	672.0	486.3	88.00
Terrain Line60	154	810.9	312.7	64.00
	155	809.0	344.2	83.00
	156	809.5	347.6	83.00
	157	807.3	368.4	91.00
	158	807.8	373.3	92.00
	159	810.8	387.2	96.00
	160	812.9	395.1	100.00
	161	810.2	400.2	100.50
	162	808.0	415.5	101.00
Terrain Line61	163	842.9	392.4	100.00
	164	927.1	293.8	64.00
Terrain Line62	165	840.9	400.5	100.00
	166	892.0	398.3	88.00
	167	910.4	418.5	78.00
	168	921.7	445.7	68.00

INPUT: TERRAIN LINES

		169	914.4	475.3	57.00
Terrain Line63		170	840.9	400.5	100.00
		171	862.6	407.0	94.00
		172	868.2	413.8	88.60
		173	869.7	417.8	83.30
		174	871.2	429.8	78.00
		175	867.6	448.9	69.00
		176	867.2	458.6	60.00
		177	857.5	463.5	56.00
Terrain Line64		178	704.4	355.8	74.00
		179	720.8	337.9	45.00
Terrain Line65		180	704.8	353.7	73.00
		181	691.7	331.7	35.00
		182	642.7	268.9	28.00
		183	605.9	215.3	1.00
Terrain Line67		184	736.6	323.7	45.00
		185	764.3	305.5	63.50
Terrain Line68		186	637.9	185.4	28.00
		187	686.6	239.3	35.00
		188	725.5	278.7	50.00
		189	762.6	303.1	63.50
Terrain Line91		190	1,381.1	887.8	2.50
		191	1,388.2	888.0	0.50
Terrain Line92		192	1,255.4	835.2	4.80
		193	1,275.9	841.3	4.00
		194	1,302.6	857.7	21.50
		195	1,310.6	860.4	21.60
		196	1,319.0	863.7	21.80
		197	1,326.4	866.5	22.00
		198	1,342.1	870.6	8.00
		199	1,350.6	876.0	6.00
		200	1,359.8	876.3	3.50
Terrain Line93		201	1,374.2	884.6	3.50
		202	1,381.9	877.2	0.50
Terrain Line94		203	1,375.4	878.4	0.50
		204	1,370.7	880.7	3.50

INPUT: TERRAIN LINES

Yerba Buena Island 08080090.11

Terrain Line95	205	1,367.1	875.0	3.50
	206	1,369.1	869.7	0.50
Terrain Line96	207	1,365.4	864.5	0.50
	208	1,361.8	867.1	3.00
Terrain Line97	209	1,359.7	853.1	0.50
	210	1,357.2	857.0	3.00
Terrain Line98	211	1,326.7	861.5	22.00
	212	1,336.5	858.0	6.00
	213	1,344.5	855.0	3.50
Terrain Line101	214	1,361.6	847.0	0.50
	215	1,353.4	848.2	3.00
Terrain Line104	216	1,229.0	777.5	2.80
	217	1,213.2	761.4	4.50
	218	1,205.9	754.1	2.50
Terrain Line105	219	1,215.0	782.3	3.00
	220	1,205.8	777.1	5.50
Terrain Line106	221	1,180.2	792.7	7.00
	222	1,189.0	800.8	4.00
	223	1,194.2	799.2	3.50
Terrain Line107	224	1,194.9	244.3	0.50
	225	1,185.4	457.2	0.50
	226	1,235.9	464.7	0.50
	227	1,266.6	541.5	0.50
	228	1,257.8	544.8	0.50
	229	1,229.2	473.2	0.50
	230	1,227.5	473.0	0.50
	231	1,199.6	469.0	0.50
	232	1,180.9	466.2	0.50
	233	1,180.3	469.1	0.50
	234	1,174.9	498.9	0.50
	235	1,173.2	509.1	0.50
	236	1,173.2	512.1	0.50
	237	1,172.0	518.2	0.50
	238	1,171.9	521.6	0.50
	239	1,171.4	525.3	0.50
	240	1,171.3	529.7	0.50



	241	1,172.5	531.1	0.50
	242	1,172.3	533.2	0.50
	243	1,172.1	539.1	0.50
	244	1,171.6	541.1	0.50
	245	1,172.0	544.4	0.50
	246	1,173.2	555.6	0.50
	247	1,174.5	564.4	0.50
	248	1,175.3	573.2	0.50
	249	1,179.6	585.3	0.50
	250	1,183.1	596.3	0.50
	251	1,187.5	611.4	0.50
	252	1,187.8	614.8	0.50
	253	1,189.4	622.0	0.50
	254	1,189.8	623.7	0.50
	255	1,188.6	625.3	0.50
	256	1,188.8	627.1	0.50
	257	1,189.2	630.8	0.50
	258	1,190.0	632.5	0.50
	259	1,190.4	636.0	0.50
	260	1,190.3	639.4	0.50
	261	1,190.7	642.2	0.50
	262	1,191.1	647.4	0.50
	263	1,191.1	650.2	0.50
	264	1,191.0	654.0	0.50
	265	1,190.9	659.3	0.50
	266	1,191.1	662.8	0.50
	267	1,191.1	666.6	0.50
	268	1,190.2	668.1	0.50
	269	1,190.2	672.3	0.50
	270	1,190.4	679.4	0.50
	271	1,190.5	682.7	0.50
	272	1,190.9	685.9	0.50
	273	1,191.2	690.0	0.50
	274	1,191.4	692.6	0.50
	275	1,191.9	695.6	0.50
	276	1,192.7	700.8	0.50

INPUT: TERRAIN LINES

	277	1,194.1	706.5	0.50
	278	1,195.5	712.2	0.50
	279	1,196.9	715.2	0.50
	280	1,197.2	717.2	0.50
	281	1,197.8	718.6	0.50
	282	1,200.2	720.8	0.50
	283	1,203.2	727.2	0.50
	284	1,204.1	729.8	0.50
	285	1,212.5	738.1	0.50
	286	1,221.0	746.1	0.50
	287	1,227.9	752.4	0.50
	288	1,233.7	756.7	0.50
	289	1,244.8	764.6	0.50
	290	1,255.9	773.7	0.50
	291	1,258.1	775.0	0.50
	292	1,268.6	782.8	0.50
	293	1,280.0	790.9	0.50
	294	1,290.3	796.6	0.50
	295	1,303.1	804.8	0.50
	296	1,318.1	815.1	0.50
	297	1,324.4	818.4	0.50
	298	1,326.2	819.1	0.50
	299	1,327.8	819.2	0.50
	300	1,328.8	820.6	0.50
	301	1,330.4	820.3	0.50
	302	1,331.8	820.1	0.50
	303	1,332.5	818.7	0.50
	304	1,333.9	817.7	0.50
	305	1,335.2	818.5	0.50
	306	1,336.7	816.7	0.50
	307	1,337.6	815.9	0.50
	308	1,338.2	817.1	0.50
	309	1,337.6	818.8	0.50
	310	1,338.6	820.7	0.50
	311	1,341.8	822.5	0.50
	312	1,344.5	824.8	0.50

## INPUT: TERRAIN LINES

	313	1,349.8	825.0	0.50
	314	1,354.6	825.1	0.50
	315	1,358.7	826.3	0.50
	316	1,359.3	825.9	0.50
	317	1,365.3	836.6	0.50
	318	1,364.1	838.4	0.50
	319	1,362.9	840.3	0.50
	320	1,363.1	841.5	0.50
	321	1,360.5	844.2	0.50
Terrain Line108	322	1,181.9	757.8	6.50
	323	1,176.6	759.9	7.00
	324	1,166.9	766.8	8.00
Terrain Line109	325	1,163.8	737.6	3.50
	326	1,166.1	743.2	4.00
	327	1,167.8	756.3	7.00
Terrain Line110	328	1,124.1	751.2	4.50
	329	1,137.2	754.8	8.00
	330	1,149.2	753.7	8.50
	331	1,148.0	748.0	7.50
	332	1,154.0	741.7	5.00
	333	1,158.8	736.2	3.50
Terrain Line111	334	1,121.0	740.9	8.00
	335	1,117.9	735.8	8.00
	336	1,117.5	726.6	7.50
	337	1,116.9	722.0	6.50
	338	1,118.4	712.7	3.50
Terrain Line112	339	1,105.0	721.6	3.50
	340	1,103.1	731.0	8.00
Terrain Line113	341	1,072.7	688.4	8.00
	342	1,078.7	687.3	3.00
	343	1,107.3	690.7	2.60
Terrain Line114	344	990.9	602.5	46.00
	345	1,048.9	663.1	8.00
	346	1,064.8	669.3	7.80
	347	1,069.6	668.8	7.50
	348	1,079.5	670.4	5.00



INPUT: TERRAIN LINES

	349	1,087.5	672.6	4.00
	350	1,104.2	674.3	3.00
Terrain Line115	351	1,038.5	622.4	10.00
	352	1,057.4	641.7	7.00
	353	1,068.2	649.1	6.50
	354	1,078.2	648.0	3.50
	355	1,082.0	647.3	3.00
Terrain Line116	356	1,071.2	619.8	3.00
	357	1,063.3	619.9	6.50
Terrain Line117	358	1,061.5	576.9	6.00
	359	1,064.6	593.9	6.00
	360	1,067.4	607.7	6.00
	361	1,070.8	617.6	6.00
Terrain Line118	362	982.9	544.4	49.00
	363	989.3	547.7	46.00
	364	999.8	555.6	46.00
	365	1,023.7	579.9	20.00
	366	1,038.7	588.3	10.00
	367	1,046.4	597.4	6.50
	368	1,062.2	594.6	6.00
Terrain Line119	369	1,007.5	504.4	47.50
	370	1,010.6	494.7	44.00
	371	1,014.9	493.3	43.50
	372	1,023.2	496.8	43.00
	373	1,069.9	515.7	10.00
	374	1,074.4	517.6	5.50
Terrain Line120	375	992.9	400.8	58.00
	376	1,006.1	412.7	50.00
	377	1,015.3	422.6	48.00
	378	1,023.7	431.6	46.00
	379	1,058.4	447.9	32.00
	380	1,083.4	468.6	10.00
	381	1,096.7	481.6	4.50
Terrain Line121	383	1,022.2	407.4	50.00
	384	1,055.4	413.0	40.00
	385	1,100.5	418.5	30.00

## INPUT: TERRAIN LINES

Yerba Buena Island 08080090.11

	386	1,136.9	455.0	3.50
Terrain Line122	387	1,028.9	370.3	48.00
	388	1,022.0	367.3	52.00
Terrain Line123	389	1,022.3	356.0	52.00
	390	1,030.1	356.4	48.00
	391	1,045.4	357.6	44.00
	392	1,111.6	368.9	30.00
	393	1,139.3	352.0	3.50
Terrain Line124	394	931.8	287.3	63.00
	395	939.6	267.2	52.00
Terrain Line125	396	623.1	170.0	0.50
	397	655.3	163.2	0.50
	398	675.3	159.5	0.50
	399	720.1	166.3	0.50
	400	767.8	185.0	0.50
	401	817.2	188.4	0.50
	402	841.6	182.2	0.50
	403	858.7	164.0	0.50
	404	870.5	170.5	0.50
	405	933.0	169.7	0.50
	406	1,000.2	168.9	0.50
	407	1,029.7	161.6	0.50
	408	1,045.0	146.3	0.50
	409	1,064.6	126.7	0.50
	410	1,089.9	124.5	0.50
	411	1,113.2	129.6	0.50
	412	1,123.2	150.0	0.50
	413	1,133.4	182.6	0.50
	414	1,147.6	197.2	0.50
	415	1,158.0	201.2	0.50
	416	1,157.6	215.4	0.50
	417	1,182.2	241.8	0.50
Terrain Line126	418	873.5	285.5	60.00
	419	852.1	231.5	43.50
Terrain Line127	420	774.2	202.5	32.00
	421	771.7	229.2	39.00

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INPUT: TERRAIN LINES

	422	773.0	258.5	45.50
	423	783.0	281.8	50.00
	424	789.5	299.9	62.00
Terrain Line128	425	731.2	322.8	62.00
	426	585.5	155.4	62.00
Terrain Line129	427	731.8	322.4	45.00
	428	585.4	154.2	45.00
Terrain Line99-Terrain Line100	429	1,316.3	855.7	22.00
	430	1,317.0	850.3	12.00
	431	1,318.4	839.6	3.50
Terrain Line40	432	735.6	450.1	103.50
	433	732.8	482.9	90.00
	434	747.1	487.5	86.50
	435	749.9	491.1	86.50
	436	750.6	493.1	86.50
	437	764.3	531.7	78.50
	438	759.0	550.4	75.50
	439	770.9	561.9	75.50
	440	769.7	567.1	74.00
	441	779.4	574.5	70.00
	442	790.9	603.2	68.00
Terrain Line30	443	1,079.1	831.3	11.00
	444	1,073.5	831.0	12.50
	445	1,060.1	827.9	13.50
	446	1,048.9	825.2	14.50
	447	1,039.4	825.3	13.50
	448	1,027.0	825.3	12.30
	449	1,014.9	823.9	11.80
	450	1,001.2	822.3	11.00
Terrain Line136	451	1,194.0	244.3	3.00
	452	1,184.9	457.6	3.00
	453	1,235.6	465.2	3.00
	454	1,266.0	541.2	3.00
	455	1,258.1	544.2	3.00
	456	1,229.6	472.7	3.00
	457	1,227.5	472.5	3.00



	458	1,199.7	468.5	3.00
	459	1,180.5	465.6	3.00
	460	1,179.8	469.0	3.00
	461	1,174.4	498.8	3.00
	462	1,172.7	509.1	3.00
	463	1,170.0	515.1	3.00
	464	1,169.7	519.3	3.00
	465	1,169.5	522.3	3.00
	466	1,168.3	525.4	3.00
	467	1,167.7	530.6	3.00
	468	1,167.4	534.2	3.00
	469	1,167.7	537.6	3.00
	470	1,168.1	540.8	3.00
	471	1,168.3	543.9	3.00
	472	1,167.8	546.3	3.00
	473	1,168.9	554.7	3.00
	474	1,170.9	566.0	3.00
	475	1,171.4	572.0	3.00
	476	1,173.6	580.4	3.00
	477	1,177.0	592.0	3.00
	478	1,181.4	606.3	3.00
	479	1,183.0	615.2	3.00
	480	1,183.4	622.6	3.00
	481	1,183.2	631.3	3.00
	482	1,183.4	633.6	3.00
	483	1,182.4	643.8	3.00
	484	1,183.0	646.5	3.00
	485	1,183.1	647.2	3.00
	486	1,184.0	655.7	3.00
	487	1,184.1	658.5	3.00
	488	1,184.2	660.1	3.00
	489	1,184.2	662.9	3.00
	490	1,184.1	666.7	3.00
	491	1,184.0	672.0	3.00
	492	1,184.2	675.5	3.00
	493	1,184.2	679.2	3.00

INPUT: TERRAIN LINES

Yerba Buena Island 08080090.11

	494	1,183.3	680.6	3.00
	495	1,183.3	685.0	3.00
	496	1,183.9	690.2	3.00
	497	1,184.7	693.7	3.00
	498	1,186.4	697.2	3.00
	499	1,187.6	700.5	3.00
	500	1,188.5	704.7	3.00
	501	1,189.7	709.4	3.00
	502	1,190.3	712.9	3.00
	503	1,191.0	717.3	3.00
	504	1,192.2	721.2	3.00
	505	1,193.7	722.0	3.00
	506	1,194.4	723.6	3.00
	507	1,194.7	725.8	3.00
	508	1,194.2	728.5	3.00
	509	1,197.8	728.0	3.00
	510	1,199.9	731.9	3.00
	511	1,202.7	736.9	3.00
	512	1,205.2	742.3	3.00
	513	1,205.9	747.6	3.00
	514	1,209.3	752.7	3.00
	515	1,223.2	764.8	3.00
	516	1,229.4	767.7	3.00
	517	1,239.2	775.1	3.00
	518	1,257.9	788.1	3.00
	519	1,262.4	791.9	3.00
	520	1,267.0	794.0	3.00
	521	1,272.5	799.6	3.00
	522	1,294.5	811.0	3.00
	523	1,305.7	815.9	3.00
	524	1,312.6	820.8	3.00
	525	1,318.8	823.7	3.00
	526	1,323.2	825.6	3.00
	527	1,325.4	826.1	3.00
	528	1,333.6	825.3	3.00
	529	1,334.4	825.7	3.00

INPUT: TERRAIN LINES

Yerba Buena Island 08080090.11

	530	1,335.4	827.4	3.00
	531	1,337.0	828.7	3.00
	532	1,338.4	828.8	3.00
	533	1,340.0	826.6	3.00
	534	1,344.4	825.1	3.00
	535	1,351.7	829.0	3.00
	536	1,359.1	833.1	3.00
	537	1,361.3	834.5	3.00
	538	1,360.8	836.6	3.00
	539	1,355.7	842.5	3.00
	540	1,354.4	844.7	3.00
Terrain Line128-2-2	541	573.6	173.9	62.00
	542	714.3	330.2	62.00
Terrain Line129-2-2	543	572.8	174.0	45.00
	544	713.8	330.7	45.00
Terrain Line141	545	0.0	1,500.0	0.00
	546	2,000.0	1,500.0	0.00
	547	2,000.0	0.0	0.00
	548	0.0	0.0	0.00
	549	0.0	1,500.0	0.00
Terrain Line142	550	861.8	450.3	69.00
	551	863.1	451.9	69.00
	552	857.5	456.7	69.00
	553	856.0	455.0	69.00
	554	834.0	474.6	69.00
	555	835.4	476.2	69.00
	556	829.9	481.1	69.00
	557	828.6	479.5	69.00
Terrain Line143	572	993.1	522.3	48.00
	571	992.3	505.4	50.00
	558	992.1	495.6	52.00
	559	990.7	485.9	52.50
	560	990.2	474.8	53.00
	562	989.5	445.6	55.00
	563	992.4	419.6	58.00
	564	990.0	376.3	61.00



INPUT: TERRAIN LINES

Yerba Buena Island 08080090.11

	565	989.9	347.9	62.00
	566	995.0	340.8	58.00
	567	998.9	335.5	57.00
	568	1,000.8	332.5	56.50
	569	1,002.4	329.8	56.00
Terrain Line148	573	1,002.5	407.0	52.00
	574	1,005.9	407.0	51.80
	575	1,015.3	407.0	51.80
	576	1,020.0	405.4	51.80
	577	1,021.9	402.4	51.80

INPUT: GROUND ZONES

EDAW/AECOM

Mike Carr SN 65282

13 August 2009

TNM 2.5

INPUT: GROUND ZONES

PROJECT/CONTRACT:

Yerba Buena Island 08080090.11

RUN:

Existing

Ground Zone Name	Type	Flow Resistivity cgs rayls	Points		
			No.	Coordinates	
				X	Y
				m	m
Ground Zone3	Lawn	300	17	1,069.7	701.9
			18	1,037.8	627.8
			19	1,040.9	594.6
			20	1,091.6	476.6
			21	1,137.6	450.8
			22	1,144.3	356.9
			23	1,119.0	364.4
			24	996.0	342.4
			25	996.0	410.8
			26	996.0	448.3
			27	996.0	488.9
			28	1,006.5	490.8
			29	1,006.5	498.5
			30	1,015.3	522.2
			31	988.6	576.4
			32	990.1	608.1
			33	1,027.2	652.6
Ground Zone4	Lawn	300	34	1,161.5	563.3
			35	1,165.6	564.4
			36	1,172.6	592.4
			37	1,171.3	609.4
			38	1,168.9	612.9
			39	1,164.1	614.5

INPUT: GROUND ZONES

Yerba Buena Island 08080090.11

				40	1,135.6	610.0
				41	1,124.9	610.5
				42	1,120.5	607.2
				43	1,119.0	601.1
				44	1,121.1	584.5
				45	1,123.2	576.1
				46	1,132.4	567.7
				47	1,141.7	567.1
				48	1,152.2	568.7



## RESULTS: SOUND LEVELS

Yerba Buena Island 08080090.11

EDAW/AECOM

Mike Carr SN 65282

20 October 2009

TNM 2.5

Calculated with TNM 2.5

## RESULTS: SOUND LEVELS

PROJECT/CONTRACT:

Yerba Buena Island 08080090.11

RUN:

Existing

## BARRIER DESIGN:

INPUT HEIGHTS

Average pavement type shall be used unless  
a State highway agency substantiates the use  
of a different type with approval of FHWA.

ATMOSPHERICS:

20 deg C, 50% RH

Receiver

Name	No.	#DUs	Existing LAeq1h	No Barrier		Increase over existing	Type Impact	With Barrier		Noise Reduction	Calculated minus Goal
				LAeq1h	Crit'n	Calculated		LAeq1h	Calculated		
			dBA	dBA	dBA	dB	dB	dB	dB	dB	dB
R-1	9	1	67.4	67.5	71	0.1	12	67.5	0.0	5	-5.0
R-2 (ST-1)	16	1	71.4	71.4	71	0.0	12	71.4	0.0	5	-5.0
R-3	17	1	71.4	73.5	66	2.1	12	73.5	0.0	5	-5.0
R-4 (ST-3)	18	1	71.4	71.4	71	0.0	12	71.4	0.0	5	-5.0
R-5	19	1	70.4	70.4	71	0.0	12	70.4	0.0	5	-5.0
R-6	20	1	0.0	66.1	66	66.1	12	66.1	0.0	5	-5.0
R-7	21	1	0.0	67.1	66	67.1	12	67.1	0.0	5	-5.0
R-8	22	1	0.0	64.2	66	64.2	12	64.2	0.0	5	-5.0
R-9	24	1	0.0	63.4	66	63.4	12	63.4	0.0	5	-5.0
R-10 (ST-2)	25	1	65.9	65.7	66	-0.2	12	65.7	0.0	5	-5.0
R-11	38	1	0.0	54.8	66	54.8	12	54.8	0.0	5	-5.0
R-12 (ST-4)	39	1	63.5	65.5	66	2.0	12	65.5	0.0	5	-5.0
R-13 (ST-5)	40	1	60.9	57.0	71	-3.9	12	57.0	0.0	5	-5.0
R-14	41	1	0.0	64.6	66	64.6	12	64.6	0.0	5	-5.0
R-15	42	1	0.0	62.2	66	62.2	12	62.2	0.0	5	-5.0
R-16	43	1	73.1	71.2	71	-1.9	12	71.2	0.0	5	-5.0
R-17	59	1	0.0	60.2	66	60.2	12	60.2	0.0	5	-5.0

Dwelling Units

# DUs Noise Reduction

	# DUs	Noise Reduction		
		Min dB	Avg dB	Max dB
All Selected	17	0.0	0.0	0.0
All Impacted	6	0.0	0.0	0.0
All that meet NR Goal	0	0.0	0.0	0.0

INPUT: ROADWAYS

Yerba Buena Island 08080090.11

EDAW/AECOM  
Maddux, B.13 August 2009  
TNM 2.5

INPUT: ROADWAYS

Average pavement type shall be used unless  
a State highway agency substantiates the use  
of a different type with the approval of FHWAPROJECT/CONTRACT: Yerba Buena Island 08080090.11  
RUN: Future No Build

Roadway Name	Width	Points				Coordinates (pavement)				Flow Control			Segment	
		Name	No.	X	Y	Z				Control Device	Speed Constraint	Percent Vehicles Affected	Pvmt Type	On Struct?
	m			m	m	m					km/h	%		
SFOBB WB OFF SE	3.7	point82	70	971.1	592.8	58.00							Average	
		point81	71	929.3	546.5	57.00							Average	
		point80	72	884.6	498.2	57.00							Average	
		point79	73	884.0	493.9	57.00							Average	
		point78	74	885.1	490.1	57.00							Average	
		point77	75	887.5	487.3	57.00							Average	
		point76	76	899.1	483.8	57.00							Average	
		point75	77	914.4	479.1	57.00							Average	
		point74	78	929.8	473.0	56.50							Average	
		point73	79	943.5	465.6	56.00								
SFOBB EB OFF SE	3.7	point96	80	886.6	496.7	58.00							Average	
		point95	81	919.4	524.9	51.20							Average	
		point94	82	925.7	530.1	51.30							Average	
		point93	83	946.1	550.2	51.50							Average	
		point92	84	949.8	552.6	51.50							Average	
		point91	85	952.0	553.6	51.50							Average	
		point90	86	958.8	555.0	51.50							Average	
		point89	87	963.5	554.4	51.20							Average	
		point88	88	966.9	553.3	51.00							Average	
		point87	89	970.1	551.7	50.80							Average	
		point86	90	977.5	545.3	50.50							Average	
		point85	91	979.9	542.2	50.00							Average	
		point84	92	982.5	534.0	49.50							Average	
		point83	93	986.4	520.0	48.00								
SFOBB WB ON NE	3.7	point106	94	954.5	634.9	47.50				Onramp	72.00	100	Average	

## INPUT: ROADWAYS

Yerba Buena Island 08080090.11

		point105	95	883.6	554.9	56.50			Average
		point104	96	880.6	550.8	56.80			Average
		point103	97	879.5	546.3	57.00			Average
		point102	98	877.6	528.5	57.00			Average
		point101	99	875.6	521.9	57.00			Average
		point100	100	873.2	516.6	57.00			Average
		point99	101	862.9	501.7	56.70			Average
		point98	102	848.1	482.2	56.50			Average
		point97	103	840.5	473.4	56.00			
SFOBB WB OFF NE	3.7	point123	104	1,030.7	686.0	52.00			Average
		point122	105	1,013.1	666.1	52.00			Average
		point121	106	995.7	646.5	52.00			Average
		point120	107	958.4	607.9	51.80			Average
		point119	108	919.5	564.6	51.50			Average
		point118	109	900.4	542.3	51.30			Average
		point117	110	893.2	535.8	51.10			Average
		point116	111	889.0	534.8	51.00			Average
		point115	112	885.7	535.6	51.50			Average
		point114	113	883.1	538.5	52.00			Average
		point113	114	882.2	543.8	53.00			Average
		point112	115	883.3	548.8	54.00			Average
		point111	116	886.3	554.1	55.00			Average
		point107	117	956.5	633.8	47.50			
SFOBB EB ON SE	3.7	point137	118	988.1	521.8	48.00	Onramp	0.00	Average
		point136	119	984.2	536.2	49.50		100	Average
		point135	120	980.5	547.6	50.50			Average
		point134	121	976.7	558.8	51.00			Average
		point133	122	974.1	567.2	51.50			Average
		point132	123	973.6	572.5	51.50			Average
		point131	124	974.0	578.1	51.40			Average
		point130	125	974.6	580.7	51.40			Average
		point129	126	975.7	584.7	51.30			Average
		point128	127	981.1	597.1	51.40			Average
		point127	128	987.9	608.4	51.50			Average
		point126	129	995.6	619.1	51.70			Average
		point125	130	1,008.7	635.6	51.90			Average
		point124	131	1,018.4	646.7	52.00			
Forest Rd - 1	3.7	point370	354	623.6	468.2	92.00			Average
		point359	355	624.3	463.0	92.50			Average

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2

13 August 201



## INPUT: ROADWAYS

Yerba Buena Island 08080090.11

		point368	356	629.2	458.1	92.00			Average
		point367	357	639.7	452.1	91.00			Average
		point366	358	653.3	443.1	90.50			Average
		point365	359	657.8	439.3	90.00			Average
		point364	360	673.3	420.0	90.00			Average
		point363	361	678.0	415.8	90.00			Average
		point362	362	693.7	404.9	90.00			Average
		point361	363	712.9	394.2	91.00			Average
		point360	364	731.8	386.5	90.00			
Forest Rd - 2	3.7	point371	365	732.6	388.4	90.00			Average
		point372	366	713.7	396.1	91.00			Average
		point373	367	694.7	406.6	90.00			Average
		point374	368	679.3	417.4	90.00			Average
		point375	369	674.7	421.4	90.00			Average
		point376	370	659.2	440.7	90.00			Average
		point377	371	654.5	444.7	90.50			Average
		point378	372	640.8	453.8	90.00			Average
		point379	373	630.4	459.7	92.00			Average
		point380	374	626.2	463.9	92.50			Average
		point381	375	625.6	468.5	92.00			
Signal Rd - 1	3.7	point394	376	628.6	466.7	92.00			Average
		point393	377	641.6	461.7	91.50			Average
		point392	378	668.2	456.6	94.50			Average
		point391	379	674.0	454.2	94.80			Average
		point390	380	708.1	430.4	98.00			Average
		point389	381	752.6	412.0	99.50			Average
		point388	382	762.9	408.4	100.20			Average
		point387	383	777.7	407.1	101.50			Average
		point386	384	789.1	412.5	102.50			Average
		point385	385	792.9	422.4	103.00			Average
		point384	386	789.3	432.7	103.20			Average
		point383	387	781.8	439.0	103.50			Average
		point382	388	764.6	441.0	103.80			
Signal Rd - 2	3.7	point406	389	764.6	438.7	103.80			Average
		point405	390	781.7	436.9	103.50			Average
		point404	391	787.9	431.6	103.20			Average
		point403	392	790.4	422.7	103.00			Average
		point402	393	786.8	414.4	102.50			Average
		point401	394	777.5	410.1	101.50			Average

## INPUT: ROADWAYS

Yerba Buena Island 08080090.11

			point400	395	762.9	411.2	100.20		Average	
			point399	396	708.5	432.8	98.00		Average	
			point398	397	675.4	456.1	94.80		Average	
			point397	398	668.9	458.7	94.50		Average	
			point396	399	641.9	463.8	91.50		Average	
			point395	400	629.9	468.6	92.00			
SFOBB WB - 3	7.3		point668	668	1,553.4	1,058.5	58.00		Average	Y
			point667	667	1,444.4	1,022.8	58.00		Average	Y
			point666	666	1,355.7	983.9	58.00		Average	Y
			point626	626	1,266.5	925.5	58.50		Average	Y
			point625	625	1,244.7	909.5	59.70		Average	Y
			point624	624	1,209.3	881.4	59.80		Average	Y
			point623	623	1,184.1	859.5	60.00		Average	Y
			point622	622	1,141.5	818.3	60.20		Average	Y
			point621	621	1,112.6	787.8	60.50		Average	Y
			point620	620	1,083.8	753.4	60.40		Average	Y
			point619	619	1,061.4	723.7	60.20		Average	Y
			point618	618	1,048.6	705.0	60.00		Average	Y
			point617	617	988.2	619.9	56.70		Average	Y
			point616	616	969.4	597.5	56.60		Average	Y
			point615	615	951.9	577.6	56.50		Average	Y
			point614	614	864.5	478.7	56.00		Average	Y
			point613	613	851.3	463.7	56.00			
SFOBB WB - 2	7.3		point664	664	1,551.8	1,063.3	58.00		Average	Y
			point663	663	1,442.4	1,028.5	58.00		Average	Y
			point662	662	1,352.8	990.0	58.00		Average	Y
			point612	612	1,262.4	931.1	58.50		Average	Y
			point611	611	1,240.5	915.1	59.70		Average	Y
			point610	610	1,204.9	886.8	59.80		Average	Y
			point609	609	1,179.4	864.6	60.00		Average	Y
			point608	608	1,136.5	823.2	60.20		Average	Y
			point607	607	1,107.4	792.4	60.50		Average	Y
			point606	606	1,078.4	757.7	60.40		Average	Y
			point605	605	1,055.8	727.8	60.20		Average	Y
			point604	604	1,042.9	709.0	60.00		Average	Y
			point603	603	982.7	624.2	56.70		Average	Y
			point602	602	964.2	602.1	56.60		Average	Y
			point601	601	946.6	582.2	56.50		Average	Y
			point600	600	859.3	483.3	56.00		Average	Y

## INPUT: ROADWAYS

Yerba Buena Island 08080090.11

SFOBB WB - 1			point599	599	846.0	468.3	56.00					
	7.3		point660	660	1,551.3	1,067.4	58.00				Average	
			point659	659	1,441.3	1,033.4	58.00				Average	Y
			point658	658	1,351.6	995.1	58.00				Average	Y
			point596	596	1,258.3	936.8	58.50				Average	Y
			point595	595	1,236.2	920.6	59.70				Average	Y
			point594	594	1,200.4	892.2	59.80				Average	Y
			point593	593	1,174.7	869.8	60.00				Average	Y
			point592	592	1,131.5	828.1	60.20				Average	Y
			point591	591	1,102.2	797.1	60.50				Average	Y
			point590	590	1,072.9	762.1	60.40				Average	Y
			point589	589	1,050.1	731.9	60.20				Average	Y
			point588	588	1,037.2	713.0	60.00				Average	Y
			point587	587	977.1	628.5	56.70				Average	Y
			point586	586	958.9	606.6	56.60				Average	Y
			point585	585	941.4	586.9	56.50				Average	Y
			point584	584	854.1	487.9	56.00				Average	Y
			point583	583	840.8	473.0	56.00				Average	Y
	7.3		point636	636	841.0	470.8	50.00				Average	Y
			point635	635	885.6	521.5	51.50				Average	Y
			point634	634	925.6	563.7	53.00				Average	Y
			point633	633	997.7	646.8	53.50				Average	Y
			point632	632	1,070.2	729.7	53.70				Average	Y
			point631	631	1,114.7	775.7	54.00				Average	Y
			point630	630	1,133.8	791.6	54.50				Average	Y
			point629	629	1,181.8	828.2	55.00				Average	Y
			point628	628	1,216.2	857.6	55.50				Average	Y
			point669	669	1,279.1	904.6	56.00				Average	Y
			point670	670	1,371.5	962.9	56.50				Average	Y
			point671	671	1,457.8	999.3	56.70				Average	Y
SFOBB EB - 2			point672	672	1,564.3	1,032.9	57.00					
	7.3		point646	646	846.3	466.2	50.00				Average	Y
			point645	645	890.8	516.8	51.50				Average	Y
			point644	644	930.7	559.0	53.00				Average	Y
			point643	643	1,003.0	642.2	53.50				Average	Y
			point642	642	1,075.3	725.0	53.70				Average	Y
			point641	641	1,119.4	770.6	54.00				Average	Y
			point640	640	1,138.2	786.2	54.50				Average	Y
			point639	639	1,186.2	822.8	55.00				Average	Y



			point638	638	1,220.6	852.2	55.50		Average	Y
			point673	673	1,283.3	899.0	56.00		Average	Y
			point674	674	1,375.5	956.8	56.50		Average	Y
			point675	675	1,461.4	992.4	56.70		Average	Y
			point676	676	1,566.7	1,026.1	57.00			
SFOBB EB - 3	7.3		point656	656	851.5	461.6	50.00		Average	Y
			point655	655	895.9	512.1	51.50		Average	Y
			point654	654	935.9	554.4	53.00		Average	Y
			point653	653	1,008.2	637.6	53.50		Average	Y
			point652	652	1,080.5	720.3	53.70		Average	Y
			point651	651	1,124.2	765.5	54.00		Average	Y
			point650	650	1,142.5	780.7	54.50		Average	Y
			point649	649	1,190.6	817.3	55.00		Average	Y
			point648	648	1,224.9	846.7	55.50		Average	Y
			point677	677	1,287.5	893.4	56.00		Average	Y
			point678	678	1,379.6	949.5	56.50		Average	Y
			point679	679	1,465.1	986.0	56.70		Average	Y
			point680	680	1,568.8	1,019.6	57.00			
North Gate Rd - 2	3.7		point681	681	974.6	640.0	45.50		Average	
			point242	208	980.6	648.5	44.80		Average	
			point241	209	978.9	658.9	43.50		Average	
			point240	210	974.3	664.4	43.00		Average	
			point239	211	968.3	668.3	42.00		Average	
			point238	212	946.7	679.7	40.50		Average	
			point237	213	920.0	690.1	38.50		Average	
			point236	214	903.8	696.0	38.00		Average	
			point235	215	874.7	706.7	36.50		Average	
			point234	216	856.7	711.6	35.50		Average	
			point233	217	837.9	712.7	34.50		Average	
			point232	218	808.2	706.6	33.00		Average	
			point231	219	802.6	707.5	32.80		Average	
			point230	220	798.2	714.0	32.50		Average	
			point229	221	799.2	722.3	32.80		Average	
			point228	222	808.3	725.7	31.50		Average	
			point227	223	838.9	724.6	30.20		Average	
			point226	224	869.2	727.4	28.20		Average	
			point225	225	891.3	726.1	28.00		Average	
			point224	226	899.9	736.4	26.70		Average	
			point223	227	896.7	745.8	26.50		Average	

## INPUT: ROADWAYS

Yerba Buena Island 08080090.11

		point222	228	887.6	757.5	26.00	Average	
		point221	229	875.8	776.9	25.50	Average	
		point220	230	873.5	791.2	23.50	Average	
		point219	231	878.3	813.9	21.50	Average	
		point218	232	887.7	828.1	20.00	Average	
		point217	233	912.6	848.7	18.00	Average	
		point216	234	931.5	858.7	16.50	Average	
		point215	235	966.3	865.7	15.00	Average	
		point214	236	1,029.0	871.4	10.50	Average	
		point213	237	1,059.1	870.7	10.00	Average	
		point212	238	1,075.1	869.6	9.50	Average	
		point211	239	1,088.1	866.9	9.30	Average	
		point210	240	1,092.6	863.7	9.30	Average	
		point209	241	1,105.7	847.3	9.00	Average	
		point208	242	1,132.0	810.7	8.70	Average	
		point207	243	1,140.5	802.3	8.60	Average	
		point206	244	1,171.5	789.1	7.00	Average	
		point205	245	1,185.8	782.0	6.50	Average	
		point204	246	1,191.4	775.4	6.00	Average	
		point203	247	1,192.7	771.5	5.50	Average	
		point202	248	1,193.2	765.2	5.00	Average	
		point201	249	1,191.2	756.4	4.50	Average	
		point200	250	1,177.4	740.0	4.00	Average	
		point199	251	1,167.8	727.2	3.60	Average	
		point198	252	1,158.1	712.1	3.50	Average	
		point197	253	1,092.8	633.7	3.50	Average	
		point196	254	1,080.9	616.6	4.00	Average	
		point195	255	1,070.5	593.7	5.50	Average	
		point194	256	1,067.2	577.5	5.70	Average	
		point193	257	1,066.7	564.7	5.80	Average	
		point192	258	1,070.5	554.0	5.60	Average	
		point191	259	1,079.2	537.3	5.40	Average	
		point190	260	1,096.3	488.5	4.50	Average	
		point189	261	1,109.6	471.9	4.00	Average	
		point188	262	1,122.5	464.6	3.50		
North Gate Rd - 1	3.7	point359	263	1,124.1	467.5	3.50	Average	
		point358	264	1,111.4	473.9	4.00	Average	
		point357	265	1,098.7	489.2	4.50	Average	
		point356	266	1,089.0	516.7	5.00	Average	

			point355	267	1,081.7	537.9	5.40			Average
			point354	268	1,073.4	555.5	5.60			Average
			point353	269	1,070.6	565.0	5.80			Average
			point352	270	1,070.8	576.7	5.70			Average
			point351	271	1,074.8	593.1	5.50			Average
			point350	272	1,085.1	615.7	4.00			Average
			point349	273	1,095.2	630.9	3.50			Average
			point348	274	1,107.1	644.5	3.50			Average
			point347	275	1,111.6	649.3	3.50			Average
			point346	276	1,128.6	669.7	3.50			Average
			point345	277	1,137.6	681.0	3.50			Average
			point344	278	1,163.4	712.1	3.50			Average
			point343	279	1,182.9	735.2	4.00			Average
			point342	280	1,190.3	745.6	4.20			Average
			point341	281	1,195.2	752.6	4.50			Average
			point340	282	1,198.5	763.6	5.00			Average
			point339	283	1,197.7	770.3	5.50			Average
			point338	284	1,195.7	776.6	6.00			Average
			point337	285	1,188.6	784.5	6.50			Average
			point335	287	1,172.5	792.6	7.00			Average
			point334	288	1,142.9	805.1	8.60			Average
			point333	289	1,134.1	812.4	8.70			Average
			point332	290	1,120.5	831.3	8.80			Average
			point331	291	1,110.0	846.8	9.00			Average
			point330	292	1,100.5	860.4	9.10			Average
			point329	293	1,094.9	866.9	9.30			Average
			point328	294	1,089.0	870.5	9.30			Average
			point327	295	1,074.9	873.3	9.50			Average
			point326	296	1,058.3	874.8	10.00			Average
			point325	297	1,043.2	875.2	10.20			Average
			point324	298	1,028.0	874.8	10.50			Average
			point323	299	1,000.9	872.0	12.50			Average
			point322	300	965.5	867.9	15.00			Average
			point321	301	930.5	860.9	16.50			Average
			point320	302	910.8	850.2	18.00			Average
			point319	303	885.7	829.5	20.00			Average
			point318	304	876.1	814.3	21.50			Average
			point317	305	871.2	791.0	23.50			Average
			point316	306	873.5	776.2	25.50			Average



## INPUT: ROADWAYS

Yerba Buena Island 08080090.11

		point315	307	885.0	756.1	26.00			Average
		point314	308	894.1	744.9	26.50			Average
		point313	309	897.0	736.5	26.70			Average
		point312	310	890.0	728.2	28.00			Average
		point311	311	869.1	729.3	28.20			Average
		point310	312	838.6	726.6	30.20			Average
		point309	313	808.0	727.5	31.50			Average
		point308	314	797.1	724.0	32.30			Average
		point307	315	795.4	713.2	32.50			Average
		point306	316	801.7	704.8	32.80			Average
		point305	317	808.3	703.5	33.00			Average
		point304	318	837.9	709.9	34.50			Average
		point303	319	856.4	708.7	35.50			Average
		point302	320	875.3	703.6	36.50			Average
		point301	321	946.4	678.3	40.50			Average
		point300	322	967.0	665.8	42.50			Average
		point299	323	975.1	657.4	43.50			Average
		point298	324	975.4	649.8	44.80			Average
		point297	325	970.6	644.2	45.50			
Treasure Is Rd - 2	3.7	point164	132	985.1	519.1	48.00			Average
		point163	133	986.0	503.2	48.00			Average
		point162	134	984.4	452.2	53.50			Average
		point161	135	979.4	378.0	60.50			Average
		point160	136	975.4	356.4	61.50			Average
		point159	137	961.6	319.8	63.00			Average
		point158	138	950.8	306.7	63.50			Average
		point157	139	935.5	296.0	64.00			Average
		point156	140	921.7	290.2	64.00			Average
		point155	141	904.0	289.3	60.50			Average
		point154	142	896.6	291.0	60.80			Average
		point153	143	798.8	311.0	62.50			Average
		point152	144	776.7	316.4	62.20			Average
		point151	145	769.7	319.5	62.00			Average
		point150	146	728.3	352.1	71.50			Average
		point149	147	707.3	362.0	72.80			Average
		point148	148	694.4	363.4	74.00			Average
		point147	149	683.5	362.8	73.00			Average
		point146	150	671.9	360.6	72.50			Average
		point145	151	660.7	356.8	71.50			Average

## INPUT: ROADWAYS

Yerba Buena Island 08080090.11

			point144	152	654.9	355.4	70.00			Average
			point143	153	602.5	340.2	63.00			Average
			point142	154	591.8	337.9	62.00			Average
			point141	155	582.9	336.9	61.00			Average
			point140	156	571.6	337.4	60.00			Average
			point139	157	557.7	340.8	57.50			
Macalla Rd - 1	3.7		point713	713	970.6	644.2	45.50			Average
			point296	326	963.7	642.0	46.00			Average
			point295	327	954.1	643.0	47.50			Average
			point294	328	909.2	655.7	52.00			Average
			point293	329	863.1	668.1	56.50			Average
			point292	330	851.7	668.3	57.50			Average
			point291	331	838.7	666.6	58.50			Average
			point290	332	822.7	661.3	59.50			Average
			point289	333	790.9	647.9	65.00			Average
			point288	334	781.7	638.5	66.00			Average
			point287	335	776.7	627.2	66.20			Average
			point286	336	775.1	615.1	66.50			Average
			point285	337	763.7	595.8	67.50			Average
			point284	338	749.0	584.6	68.50			Average
			point283	339	730.6	577.1	69.50			Average
			point282	340	711.5	575.6	70.00			Average
			point281	341	688.8	580.4	70.50			Average
			point280	342	671.1	587.3	71.00			Average
			point279	343	658.3	586.9	70.60			Average
			point278	344	635.8	585.6	70.30			Average
			point277	345	618.9	584.9	70.00			Average
			point276	346	610.5	587.9	68.50			Average
			point275	347	590.6	604.4	67.50			
Treasure Is Rd - 1-2	3.7		point715	715	556.4	336.6	57.50			Average
			point185	161	571.0	332.7	60.00			Average
			point184	162	583.3	332.3	61.00			Average
			point183	163	594.8	332.7	62.00			Average
			point182	164	664.7	354.5	71.00			Average
			point181	165	676.6	357.9	72.50			Average
			point180	166	686.6	359.0	73.00			Average
			point179	167	694.3	359.5	74.00			Average
			point178	168	706.9	358.4	72.80			Average
			point177	169	726.5	348.7	71.50			Average

		point176	170	767.9	316.6	62.00			Average
		point175	171	776.8	312.8	62.20			Average
		point174	172	904.5	285.9	60.00			Average
		point173	173	924.4	287.5	64.00			Average
		point172	174	940.3	294.3	64.00			Average
		point171	175	956.4	306.2	63.50			Average
		point170	176	966.8	319.1	63.00			Average
		point169	177	975.3	338.1	61.00			Average
		point168	178	980.9	359.6	61.50			Average
		point167	179	983.1	378.2	60.50			Average
		point166	180	990.1	506.3	48.50			Average
		point165	181	988.9	518.9	48.00			
	3.7	point1664	717	589.2	601.8	67.50			Average
Macalla Rd - 2		point262	718	608.9	584.9	68.50			Average
		point261	719	619.0	581.8	70.00			Average
		point260	720	649.0	583.5	71.00			Average
		point259	721	671.1	584.4	71.00			Average
		point258	722	687.7	577.3	70.50			Average
		point257	723	711.7	572.7	70.00			Average
		point256	724	731.9	574.3	69.50			Average
		point255	725	750.7	582.4	68.50			Average
		point254	726	765.5	593.8	67.50			Average
		point253	727	778.2	614.7	66.50			Average
		point252	728	780.7	627.7	66.20			Average
		point251	729	784.5	637.3	66.00			Average
		point250	730	792.7	645.2	65.00			Average
		point249	731	824.3	658.8	58.50			Average
		point248	732	840.9	664.0	58.50			Average
		point247	733	852.9	665.3	57.50			Average
		point246	734	862.9	665.1	56.50			Average
		point245	735	953.4	637.5	47.50			Average
		point244	736	965.0	636.8	46.50			Average
		point243	737	974.6	640.0	45.50			



EDAW/AECOM  
Maddux, B.

13 August 2009  
TNM 2.5

INPUT: TRAFFIC FOR LAeq1h Volumes

PROJECT/CONTRACT:

Yerba Buena Island 08080090.11

RUN: Future No Build

Roadway		Points		No.		Segment		Autos		MTrucks		HTrucks		Buses		Motorcycles	
Name		Name						V	S	V	S	V	S	V	S	V	S
				veh/hr	km/h	veh/hr	km/h	veh/hr	km/h	veh/hr	km/h	veh/hr	km/h	veh/hr	km/h	veh/hr	km/h
SFOBB WB OFF SE		point82		70	314	88	88	4	88	5	88	0	0	0	0	0	0
		point81		71	314	88	88	4	88	5	88	0	0	0	0	0	0
		point80		72	314	88	88	4	88	5	88	0	0	0	0	0	0
		point79		73	314	88	88	4	88	5	88	0	0	0	0	0	0
		point78		74	314	88	88	4	88	5	88	0	0	0	0	0	0
		point77		75	314	88	88	4	88	5	88	0	0	0	0	0	0
		point76		76	314	88	88	4	88	5	88	0	0	0	0	0	0
		point75		77	314	88	88	4	88	5	88	0	0	0	0	0	0
		point74		78	314	88	88	4	88	5	88	0	0	0	0	0	0
		point73		79													
SFOBB EB OFF SE		point96		80	248	88	88	3	88	4	88	0	0	0	0	0	0
		point95		81	248	88	88	3	88	4	88	0	0	0	0	0	0
		point94		82	248	88	88	3	88	4	88	0	0	0	0	0	0
		point93		83	248	88	88	3	88	4	88	0	0	0	0	0	0
		point92		84	248	88	88	3	88	4	88	0	0	0	0	0	0
		point91		85	248	88	88	3	88	4	88	0	0	0	0	0	0
		point90		86	248	88	88	3	88	4	88	0	0	0	0	0	0
		point89		87	248	88	88	3	88	4	88	0	0	0	0	0	0
		point88		88	248	88	88	3	88	4	88	0	0	0	0	0	0
		point87		89	248	88	88	3	88	4	88	0	0	0	0	0	0
		point86		90	248	88	88	3	88	4	88	0	0	0	0	0	0
		point85		91	248	88	88	3	88	4	88	0	0	0	0	0	0
		point84		92	248	88	88	3	88	4	88	0	0	0	0	0	0



## INPUT: TRAFFIC FOR LAeq1h Volumes

Yerba Buena Island 08080090.11

	point126	129	476	88	6	88	8	88	0	0	0	0
	point125	130	476	88	6	88	8	88	0	0	0	0
	point124	131										
Forest Rd - 1	point370	354	12	25	0	0	0	0	0	0	0	0
	point369	355	12	25	0	0	0	0	0	0	0	0
	point368	356	12	25	0	0	0	0	0	0	0	0
	point367	357	12	25	0	0	0	0	0	0	0	0
	point366	358	12	25	0	0	0	0	0	0	0	0
	point365	359	12	25	0	0	0	0	0	0	0	0
	point364	360	12	25	0	0	0	0	0	0	0	0
	point363	361	12	25	0	0	0	0	0	0	0	0
	point362	362	12	25	0	0	0	0	0	0	0	0
	point361	363	12	25	0	0	0	0	0	0	0	0
	point360	364										
Forest Rd - 2	point371	365	12	25	0	0	0	0	0	0	0	0
	point372	366	12	25	0	0	0	0	0	0	0	0
	point373	367	12	25	0	0	0	0	0	0	0	0
	point374	368	12	25	0	0	0	0	0	0	0	0
	point375	369	12	25	0	0	0	0	0	0	0	0
	point376	370	12	25	0	0	0	0	0	0	0	0
	point377	371	12	25	0	0	0	0	0	0	0	0
	point378	372	12	25	0	0	0	0	0	0	0	0
	point379	373	12	25	0	0	0	0	0	0	0	0
	point380	374	12	25	0	0	0	0	0	0	0	0
	point381	375										
Signal Rd - 1	point394	376	10	40	0	0	0	0	0	0	0	0
	point393	377	10	40	0	0	0	0	0	0	0	0
	point392	378	10	40	0	0	0	0	0	0	0	0
	point391	379	10	40	0	0	0	0	0	0	0	0
	point390	380	10	40	0	0	0	0	0	0	0	0
	point389	381	10	40	0	0	0	0	0	0	0	0
	point388	382	10	40	0	0	0	0	0	0	0	0
	point387	383	10	40	0	0	0	0	0	0	0	0
	point386	384	10	40	0	0	0	0	0	0	0	0
	point385	385	10	40	0	0	0	0	0	0	0	0
	point384	386	10	40	0	0	0	0	0	0	0	0



INPUT: TRAFFIC FOR LAeq1h Volumes

Yerba Buena Island 08080090.11

	point383	387	10	40	0	0	0	0	0	0	0	0	0
	point382	388											
Signal Rd - 2	point406	389	10	40	0	0	0	0	0	0	0	0	0
	point405	390	10	40	0	0	0	0	0	0	0	0	0
	point404	391	10	40	0	0	0	0	0	0	0	0	0
	point403	392	10	40	0	0	0	0	0	0	0	0	0
	point402	393	10	40	0	0	0	0	0	0	0	0	0
	point401	394	10	40	0	0	0	0	0	0	0	0	0
	point400	395	10	40	0	0	0	0	0	0	0	0	0
	point399	396	10	40	0	0	0	0	0	0	0	0	0
	point398	397	10	40	0	0	0	0	0	0	0	0	0
	point397	398	10	40	0	0	0	0	0	0	0	0	0
	point396	399	10	40	0	0	0	0	0	0	0	0	0
	point395	400											
SFOBB WB - 3	point668	668	3075	105	41	105	51	88	0	0	0	0	0
	point667	667	3075	105	41	105	51	88	0	0	0	0	0
	point666	666	3075	105	41	105	51	88	0	0	0	0	0
	point626	626	3075	105	41	105	51	88	0	0	0	0	0
	point625	625	3075	105	41	105	51	88	0	0	0	0	0
	point624	624	3075	105	41	105	51	88	0	0	0	0	0
	point623	623	3075	105	41	105	51	88	0	0	0	0	0
	point622	622	3075	105	41	105	51	88	0	0	0	0	0
	point621	621	3075	105	41	105	51	88	0	0	0	0	0
	point620	620	3075	105	41	105	51	88	0	0	0	0	0
	point619	619	3075	105	41	105	51	88	0	0	0	0	0
	point618	618	3075	105	41	105	51	88	0	0	0	0	0
	point617	617	3075	105	41	105	51	88	0	0	0	0	0
	point616	616	3075	105	41	105	51	88	0	0	0	0	0
	point615	615	3075	105	41	105	51	88	0	0	0	0	0
	point614	614	3075	105	41	105	51	88	0	0	0	0	0
	point613	613											
SFOBB WB - 2	point664	664	3075	105	41	105	51	88	0	0	0	0	0
	point663	663	3075	105	41	105	51	88	0	0	0	0	0
	point662	662	3075	105	41	105	51	88	0	0	0	0	0
	point612	612	3075	105	41	105	51	88	0	0	0	0	0
	point611	611	3075	105	41	105	51	88	0	0	0	0	0

	point610	610	3075	105	41	105	51	88	0	0	0
	point609	609	3075	105	41	105	51	88	0	0	0
	point608	608	3075	105	41	105	51	88	0	0	0
	point607	607	3075	105	41	105	51	88	0	0	0
	point606	606	3075	105	41	105	51	88	0	0	0
	point605	605	3075	105	41	105	51	88	0	0	0
	point604	604	3075	105	41	105	51	88	0	0	0
	point603	603	3075	105	41	105	51	88	0	0	0
	point602	602	3075	105	41	105	51	88	0	0	0
	point601	601	3075	105	41	105	51	88	0	0	0
	point600	600	3075	105	41	105	51	88	0	0	0
	point599	599									
SFOBB WB - 1	point660	660	3075	105	41	105	51	88	0	0	0
	point659	659	3075	105	41	105	51	88	0	0	0
	point658	658	3075	105	41	105	51	88	0	0	0
	point596	596	3075	105	41	105	51	88	0	0	0
	point595	595	3075	105	41	105	51	88	0	0	0
	point594	594	3075	105	41	105	51	88	0	0	0
	point593	593	3075	105	41	105	51	88	0	0	0
	point592	592	3075	105	41	105	51	88	0	0	0
	point591	591	3075	105	41	105	51	88	0	0	0
	point590	590	3075	105	41	105	51	88	0	0	0
	point589	589	3075	105	41	105	51	88	0	0	0
	point588	588	3075	105	41	105	51	88	0	0	0
	point587	587	3075	105	41	105	51	88	0	0	0
	point586	586	3075	105	41	105	51	88	0	0	0
	point585	585	3075	105	41	105	51	88	0	0	0
	point584	584	3075	105	41	105	51	88	0	0	0
	point583	583									
SFOBB EB - 1	point636	636	2754	105	37	105	45	88	0	0	0
	point635	635	2754	105	37	105	45	88	0	0	0
	point634	634	2754	105	37	105	45	88	0	0	0
	point633	633	2754	105	37	105	45	88	0	0	0
	point632	632	2754	105	37	105	45	88	0	0	0
	point631	631	2754	105	37	105	45	88	0	0	0
	point630	630	2754	105	37	105	45	88	0	0	0

INPUT: TRAFFIC FOR LAeq1h Volumes

Yerba Buena Island 08080090.11

	point629	629	2754	105	37	105	45	88	0	0	0
	point628	628	2754	105	37	105	45	88	0	0	0
	point669	669	2754	105	37	105	45	88	0	0	0
	point670	670	2754	105	37	105	45	88	0	0	0
	point671	671	2754	105	37	105	45	88	0	0	0
	point672	672									
SFOBB EB - 2	point646	646	2754	105	37	105	45	88	0	0	0
	point645	645	2754	105	37	105	45	88	0	0	0
	point644	644	2754	105	37	105	45	88	0	0	0
	point643	643	2754	105	37	105	45	88	0	0	0
	point642	642	2754	105	37	105	45	88	0	0	0
	point641	641	2754	105	37	105	45	88	0	0	0
	point640	640	2754	105	37	105	45	88	0	0	0
	point639	639	2754	105	37	105	45	88	0	0	0
	point638	638	2754	105	37	105	45	88	0	0	0
	point673	673	2754	105	37	105	45	88	0	0	0
	point674	674	2754	105	37	105	45	88	0	0	0
	point675	675	2754	105	37	105	45	88	0	0	0
	point676	676									
SFOBB EB - 3	point656	656	2754	105	37	105	45	88	0	0	0
	point655	655	2754	105	37	105	45	88	0	0	0
	point654	654	2754	105	37	105	45	88	0	0	0
	point653	653	2754	105	37	105	45	88	0	0	0
	point652	652	2754	105	37	105	45	88	0	0	0
	point651	651	2754	105	37	105	45	88	0	0	0
	point650	650	2754	105	37	105	45	88	0	0	0
	point649	649	2754	105	37	105	45	88	0	0	0
	point648	648	2754	105	37	105	45	88	0	0	0
	point677	677	2754	105	37	105	45	88	0	0	0
	point678	678	2754	105	37	105	45	88	0	0	0
	point679	679	2754	105	37	105	45	88	0	0	0
	point680	680									
North Gate Rd - 2	point681	681	340	40	7	40	3	40	0	0	0
	point242	208	340	40	7	40	3	40	0	0	0
	point241	209	340	40	7	40	3	40	0	0	0
	point240	210	340	40	7	40	3	40	0	0	0



## INPUT: TRAFFIC FOR LAeq1h Volumes

## Yerba Buena Island 08080090.11

point239	211	340	40	7	40	3	40	0	0	0
point238	212	340	40	7	40	3	40	0	0	0
point237	213	340	40	7	40	3	40	0	0	0
point236	214	340	40	7	40	3	40	0	0	0
point235	215	340	40	7	40	3	40	0	0	0
point234	216	340	40	7	40	3	40	0	0	0
point233	217	340	40	7	40	3	40	0	0	0
point232	218	340	40	7	40	3	40	0	0	0
point231	219	340	40	7	40	3	40	0	0	0
point230	220	340	40	7	40	3	40	0	0	0
point229	221	340	40	7	40	3	40	0	0	0
point228	222	340	40	7	40	3	40	0	0	0
point227	223	340	40	7	40	3	40	0	0	0
point226	224	340	40	7	40	3	40	0	0	0
point225	225	340	40	7	40	3	40	0	0	0
point224	226	340	40	7	40	3	40	0	0	0
point223	227	340	40	7	40	3	40	0	0	0
point222	228	340	40	7	40	3	40	0	0	0
point221	229	340	40	7	40	3	40	0	0	0
point220	230	340	40	7	40	3	40	0	0	0
point219	231	340	40	7	40	3	40	0	0	0
point218	232	340	40	7	40	3	40	0	0	0
point217	233	340	40	7	40	3	40	0	0	0
point216	234	340	40	7	40	3	40	0	0	0
point215	235	340	40	7	40	3	40	0	0	0
point214	236	340	40	7	40	3	40	0	0	0
point213	237	340	40	7	40	3	40	0	0	0
point212	238	340	40	7	40	3	40	0	0	0
point211	239	340	40	7	40	3	40	0	0	0
point210	240	340	40	7	40	3	40	0	0	0
point209	241	340	40	7	40	3	40	0	0	0
point208	242	340	40	7	40	3	40	0	0	0
point207	243	340	40	7	40	3	40	0	0	0
point206	244	340	40	7	40	3	40	0	0	0
point205	245	340	40	7	40	3	40	0	0	0
point204	246	340	40	7	40	3	40	0	0	0

INPUT: TRAFFIC FOR LAeq1h Volumes

Yerba Buena Island 08080090.11

	point203	247	340	40	7	40	3	40	0	0	0	0
	point202	248	340	40	7	40	3	40	0	0	0	0
	point201	249	340	40	7	40	3	40	0	0	0	0
	point200	250	340	40	7	40	3	40	0	0	0	0
	point199	251	340	40	7	40	3	40	0	0	0	0
	point198	252	340	40	7	40	3	40	0	0	0	0
	point197	253	340	40	7	40	3	40	0	0	0	0
	point196	254	340	40	7	40	3	40	0	0	0	0
	point195	255	340	40	7	40	3	40	0	0	0	0
	point194	256	340	40	7	40	3	40	0	0	0	0
	point193	257	340	40	7	40	3	40	0	0	0	0
	point192	258	340	40	7	40	3	40	0	0	0	0
	point191	259	340	40	7	40	3	40	0	0	0	0
	point190	260	340	40	7	40	3	40	0	0	0	0
	point189	261	340	40	7	40	3	40	0	0	0	0
	point188	262										
North Gate Rd - 1	point359	263	340	40	7	40	3	40	0	0	0	0
	point358	264	340	40	7	40	3	40	0	0	0	0
	point357	265	340	40	7	40	3	40	0	0	0	0
	point356	266	340	40	7	40	3	40	0	0	0	0
	point355	267	340	40	7	40	3	40	0	0	0	0
	point354	268	340	40	7	40	3	40	0	0	0	0
	point353	269	340	40	7	40	3	40	0	0	0	0
	point352	270	340	40	7	40	3	40	0	0	0	0
	point351	271	340	40	7	40	3	40	0	0	0	0
	point350	272	340	40	7	40	3	40	0	0	0	0
	point349	273	340	40	7	40	3	40	0	0	0	0
	point348	274	340	40	7	40	3	40	0	0	0	0
	point347	275	340	40	7	40	3	40	0	0	0	0
	point346	276	340	40	7	40	3	40	0	0	0	0
	point345	277	340	40	7	40	3	40	0	0	0	0
	point344	278	340	40	7	40	3	40	0	0	0	0
	point343	279	340	40	7	40	3	40	0	0	0	0
	point342	280	340	40	7	40	3	40	0	0	0	0
	point341	281	340	40	7	40	3	40	0	0	0	0
	point340	282	340	40	7	40	3	40	0	0	0	0

INPUT: TRAFFIC FOR LAeq1h Volumes

Yerba Buena Island 08080090.11

	point339	283	340	40	7	40	3	40	0	0	0
	point338	284	340	40	7	40	3	40	0	0	0
	point337	285	340	40	7	40	3	40	0	0	0
	point335	287	340	40	7	40	3	40	0	0	0
	point334	288	340	40	7	40	3	40	0	0	0
	point333	289	340	40	7	40	3	40	0	0	0
	point332	290	340	40	7	40	3	40	0	0	0
	point331	291	340	40	7	40	3	40	0	0	0
	point330	292	340	40	7	40	3	40	0	0	0
	point329	293	340	40	7	40	3	40	0	0	0
	point328	294	340	40	7	40	3	40	0	0	0
	point327	295	340	40	7	40	3	40	0	0	0
	point326	296	340	40	7	40	3	40	0	0	0
	point325	297	340	40	7	40	3	40	0	0	0
	point324	298	340	40	7	40	3	40	0	0	0
	point323	299	340	40	7	40	3	40	0	0	0
	point322	300	340	40	7	40	3	40	0	0	0
	point321	301	340	40	7	40	3	40	0	0	0
	point320	302	340	40	7	40	3	40	0	0	0
	point319	303	340	40	7	40	3	40	0	0	0
	point318	304	340	40	7	40	3	40	0	0	0
	point317	305	340	40	7	40	3	40	0	0	0
	point316	306	340	40	7	40	3	40	0	0	0
	point315	307	340	40	7	40	3	40	0	0	0
	point314	308	340	40	7	40	3	40	0	0	0
	point313	309	340	40	7	40	3	40	0	0	0
	point312	310	340	40	7	40	3	40	0	0	0
	point311	311	340	40	7	40	3	40	0	0	0
	point310	312	340	40	7	40	3	40	0	0	0
	point309	313	340	40	7	40	3	40	0	0	0
	point308	314	340	40	7	40	3	40	0	0	0
	point307	315	340	40	7	40	3	40	0	0	0
	point306	316	340	40	7	40	3	40	0	0	0
	point305	317	340	40	7	40	3	40	0	0	0
	point304	318	340	40	7	40	3	40	0	0	0
	point303	319	340	40	7	40	3	40	0	0	0



	point302	320	340	40	7	40	3	40	0	0	0	0
	point301	321	340	40	7	40	3	40	0	0	0	0
	point300	322	340	40	7	40	3	40	0	0	0	0
	point299	323	340	40	7	40	3	40	0	0	0	0
	point298	324	340	40	7	40	3	40	0	0	0	0
	point297	325										
Treasure Is Rd - 2	point164	132	340	65	7	65	3	65	0	0	0	0
	point163	133	340	65	7	65	3	65	0	0	0	0
	point162	134	340	65	7	65	3	65	0	0	0	0
	point161	135	340	65	7	65	3	65	0	0	0	0
	point160	136	340	65	7	65	3	65	0	0	0	0
	point159	137	340	65	7	65	3	65	0	0	0	0
	point158	138	340	65	7	65	3	65	0	0	0	0
	point157	139	340	65	7	65	3	65	0	0	0	0
	point156	140	340	65	7	65	3	65	0	0	0	0
	point155	141	340	65	7	65	3	65	0	0	0	0
	point154	142	340	65	7	65	3	65	0	0	0	0
	point153	143	340	65	7	65	3	65	0	0	0	0
	point152	144	340	65	7	65	3	65	0	0	0	0
	point151	145	340	65	7	65	3	65	0	0	0	0
	point150	146	340	65	7	65	3	65	0	0	0	0
	point149	147	340	65	7	65	3	65	0	0	0	0
	point148	148	340	65	7	65	3	65	0	0	0	0
	point147	149	340	65	7	65	3	65	0	0	0	0
	point146	150	340	65	7	65	3	65	0	0	0	0
	point145	151	340	65	7	65	3	65	0	0	0	0
	point144	152	340	65	7	65	3	65	0	0	0	0
	point143	153	340	65	7	65	3	65	0	0	0	0
	point142	154	340	65	7	65	3	65	0	0	0	0
	point141	155	340	65	7	65	3	65	0	0	0	0
	point140	156	340	65	7	65	3	65	0	0	0	0
	point139	157										
Macalla Rd - 1	point713	713	340	40	7	40	3	40	0	0	0	0
	point296	326	340	40	7	40	3	40	0	0	0	0
	point295	327	340	40	7	40	3	40	0	0	0	0
	point294	328	340	40	7	40	3	40	0	0	0	0

	point293	329	340	40	7	40	3	40	0	0	0
	point292	330	340	40	7	40	3	40	0	0	0
	point291	331	340	40	7	40	3	40	0	0	0
	point290	332	340	40	7	40	3	40	0	0	0
	point289	333	340	40	7	40	3	40	0	0	0
	point288	334	340	40	7	40	3	40	0	0	0
	point287	335	340	40	7	40	3	40	0	0	0
	point286	336	340	40	7	40	3	40	0	0	0
	point285	337	340	40	7	40	3	40	0	0	0
	point284	338	340	40	7	40	3	40	0	0	0
	point283	339	340	40	7	40	3	40	0	0	0
	point282	340	340	40	7	40	3	40	0	0	0
	point281	341	340	40	7	40	3	40	0	0	0
	point280	342	340	40	7	40	3	40	0	0	0
	point279	343	340	40	7	40	3	40	0	0	0
	point278	344	340	40	7	40	3	40	0	0	0
	point277	345	340	40	7	40	3	40	0	0	0
	point276	346	340	40	7	40	3	40	0	0	0
	point275	347									
Treasure Is Rd - 1-2	point115	715	340	65	7	65	3	65	0	0	0
	point185	161	340	65	7	65	3	65	0	0	0
	point184	162	340	65	7	65	3	65	0	0	0
	point183	163	340	65	7	65	3	65	0	0	0
	point182	164	340	65	7	65	3	65	0	0	0
	point181	165	340	65	7	65	3	65	0	0	0
	point180	166	340	65	7	65	3	65	0	0	0
	point179	167	340	65	7	65	3	65	0	0	0
	point178	168	340	65	7	65	3	65	0	0	0
	point177	169	340	65	7	65	3	65	0	0	0
	point176	170	340	65	7	65	3	65	0	0	0
	point175	171	340	65	7	65	3	65	0	0	0
	point174	172	340	65	7	65	3	65	0	0	0
	point173	173	340	65	7	65	3	65	0	0	0
	point172	174	340	65	7	65	3	65	0	0	0
	point171	175	340	65	7	65	3	65	0	0	0
	point170	176	340	0	7	65	3	65	0	0	0

INPUT: TRAFFIC FOR LAeq1h Volumes

Yerba Buena Island 08080090.11

	point169	177	340	65	7	65	3	65	0	0	0
	point168	178	340	65	7	65	3	65	0	0	0
	point167	179	340	65	7	65	3	65	0	0	0
	point166	180	340	65	7	65	3	65	0	0	0
	point165	181									
Macalla Rd - 2	point664	717	340	40	7	40	3	40	0	0	0
	point262	718	340	40	7	40	3	40	0	0	0
	point261	719	340	40	7	40	3	40	0	0	0
	point260	720	340	40	7	40	3	40	0	0	0
	point259	721	340	40	7	40	3	40	0	0	0
	point258	722	340	40	7	40	3	40	0	0	0
	point257	723	340	40	7	40	3	40	0	0	0
	point256	724	340	40	7	40	3	40	0	0	0
	point255	725	340	40	7	40	3	40	0	0	0
	point254	726	340	40	7	40	3	40	0	0	0
	point253	727	340	40	7	40	3	40	0	0	0
	point252	728	340	40	7	40	3	40	0	0	0
	point251	729	340	40	7	40	3	40	0	0	0
	point250	730	340	40	7	40	3	40	0	0	0
	point249	731	340	40	7	40	3	40	0	0	0
	point248	732	340	40	7	40	3	40	0	0	0
	point247	733	340	40	7	40	3	40	0	0	0
	point246	734	340	40	7	40	3	40	0	0	0
	point245	735	340	40	7	40	3	40	0	0	0
	point244	736	340	40	7	40	3	40	0	0	0
	point243	737									



## INPUT: RECEIVERS

Yerba Buena Island 08080090.11

EDAW/AECOM

Maddux, B.

21 October 2009

TNM 2.5

## INPUT: RECEIVERS

PROJECT/CONTRACT:

Yerba Buena Island 08080090.11

RUN:

Future No Build

## Receiver

Name	No.	#DUs	Coordinates (ground)			Height above Ground	Input Sound Levels and Criteria				Active in Calc.	
			X	Y	Z		Existing LAeq1h	Impact Criteria LAeq1h	Sub'l	NR Goal		
			m	m	m	m	dBA	dBA		dB	dB	
R-1	9	1	916.0	782.7	28.00	1.50	0.00	71	12.0	5.0		
R-2 (ST-1)	16	1	989.0	755.0	21.00	1.50	0.00	71	12.0	5.0		
R-3	17	1	855.5	618.7	64.00	1.50	0.00	66	12.0	5.0		
R-4 (ST-3)	18	1	1,163.1	658.2	2.80	1.50	0.00	71	12.0	5.0		
R-5	19	1	1,125.6	585.5	2.80	1.50	0.00	71	12.0	5.0		
R-6	20	1	1,132.2	636.9	2.70	1.50	0.00	66	12.0	5.0		
R-7	21	1	1,103.1	625.7	2.80	1.50	0.00	66	12.0	5.0		
R-8	22	1	1,095.9	589.2	2.80	1.50	0.00	66	12.0	5.0		
R-9	24	1	1,104.5	546.9	3.10	1.50	0.00	66	12.0	5.0		
R-10 (ST-2)	25	1	1,111.1	505.2	3.70	1.50	0.00	72	12.0	5.0		
R-11	38	1	1,020.4	431.5	46.00	1.50	0.00	66	12.0	5.0		
R-12 (ST-4)	39	1	1,022.0	456.0	45.00	1.50	0.00	66	12.0	5.0	Y	
R-13 (ST-5)	40	1	1,021.2	379.7	45.00	1.50	0.00	66	12.0	5.0	Y	
R-14	41	1	1,018.4	397.2	51.80	1.50	0.00	66	12.0	5.0	Y	
R-15	42	1	1,020.0	357.1	52.20	1.50	0.00	66	12.0	5.0	Y	
R-16	43	1	794.8	434.3	101.50	1.50	0.00	71	12.0	5.0	Y	
R-17	54	1	719.3	596.8	66.70	1.50	0.00	71	12.0	5.0		
R-1 0												
R-2 (ST-1) 0												
R-3 0												
R-4 (ST-3) 0												
R-5 0												

**Yerba Buena Island 08080090.11**

[illegible]

INPUT: BARRIERS

Yerba Buena Island 08080090.11

EDAW/AECOM  
Maddux, B.

13 August 2009  
TNM 2.5

INPUT: BARRIERS  
PROJECT/CONTRACT:

Yerba Buena Island 08080090.11  
Future No Build

RUN:

Barrier																Points					
Name	Type	Height		Max	If Wall \$ per Unit Area	If Berm \$ per Unit Vol.	Top Width	Run:Rise	Add'tnl \$ per Unit Length	Name	No.	Coordinates (bottom)			Height at Point		Segment			Important Reflec-tions?	
		Min										X	Y	Z	Point	Seg Ht	Perfurbs On	Incre- #Up	#Dn		Struct?
		m		m	\$/sq m	\$/cu m	m	m:m	\$/m			m	m	m	m	m					
Barrier1	W	0.00	30.48	0.00					0.00	point1	1	814.3	417.7	100.50	4.50	0.00	0	0			
										point2	2	820.7	399.2	100.50	4.50	0.00	0	0			
										point3	3	817.8	398.3	100.50	4.50	0.00	0	0			
										point4	4	819.5	393.0	100.50	4.50	0.00	0	0			
										point5	5	828.7	396.0	100.50	4.50	0.00	0	0			
										point6	6	827.9	398.5	100.50	4.50	0.00	0	0			
										point7	7	834.2	400.4	100.50	4.50	0.00	0	0			
										point8	8	834.4	399.5	100.50	4.50	0.00	0	0			
										point9	9	838.3	400.8	100.50	4.50	0.00	0	0			
										point10	10	837.2	404.2	100.50	4.50	0.00	0	0			
										point11	11	839.7	405.0	100.50	4.50	0.00	0	0			
										point12	12	834.5	421.0	100.50	4.50	0.00	0	0			
										point13	13	823.0	417.3	100.50	4.50	0.00	0	0			
										point14	14	821.9	420.4	100.50	4.50	0.00	0	0			
										point15	15	814.3	417.7	100.50	4.50						
Barrier2	W	0.00	30.48	0.00					0.00	point16	16	723.3	398.9	92.00	6.00	0.00	0	0			
										point17	17	717.0	401.9	92.00	6.00	0.00	0	0			
										point18	18	717.7	403.4	92.00	6.00	0.00	0	0			
										point19	19	708.9	407.5	92.00	6.00	0.00	0	0			
										point20	20	708.3	406.0	92.00	6.00	0.00	0	0			
										point21	21	701.9	409.0	92.00	6.00	0.00	0	0			
										point22	22	705.7	417.0	92.00	6.00	0.00	0	0			
										point23	23	707.2	416.2	92.00	6.00	0.00	0	0			
										point24	24	708.0	418.0	92.00	6.00	0.00	0	0			
										point25	25	726.3	409.4	92.00	6.00	0.00	0	0			
										point26	26	725.5	407.6	92.00	6.00	0.00	0	0			
										point27	27	727.0	406.9	92.00	6.00	0.00	0	0			
										point28	28	723.3	398.9	92.00	6.00						
	Barrier3	W	0.00	30.48	0.00					0.00	point29	29	680.1	423.5	92.00	6.00	0.00	0	0		
											point30	30	685.8	419.6	92.00	6.00	0.00	0	0		
										point31	31	686.7	420.8	92.00	6.00	0.00	0	0			
										point32	32	694.7	415.3	92.00	6.00	0.00	0	0			
										point33	33	693.9	414.1	92.00	6.00	0.00	0	0			
										point34	34	699.6	410.5	92.00	6.00	0.00	0	0			
										point35	35	704.4	417.4	92.00	6.00	0.00	0	0			





## INPUT: BARRIERS

Yerba Buena Island 08080090.11

										point85	85	654.2	436.5	86.00	6.00	0.00	0	0
										point86	86	651.1	433.9	86.00	6.00	0.00	0	0
										point87	87	650.0	435.3	86.00	6.00	0.00	0	0
										point88	88	645.1	431.4	86.00	6.00			
Barrier7		W	0.00	30.48	0.00				0.00	point89	89	662.9	409.7	88.00	6.00	0.00	0	0
										point90	90	669.4	404.1	88.00	6.00	0.00	0	0
										point91	91	668.3	402.8	88.00	6.00	0.00	0	0
										point92	92	672.3	399.4	88.00	6.00	0.00	0	0
										point93	93	673.3	400.6	88.00	6.00	0.00	0	0
										point94	94	680.0	394.9	88.00	6.00	0.00	0	0
										point95	95	684.0	399.6	88.00	6.00	0.00	0	0
										point96	96	682.6	400.7	88.00	6.00	0.00	0	0
										point97	97	684.8	403.2	88.00	6.00	0.00	0	0
										point98	98	680.3	407.1	88.00	6.00	0.00	0	0
										point99	99	681.2	408.2	88.00	6.00	0.00	0	0
										point100	100	675.7	412.9	88.00	6.00	0.00	0	0
										point101	101	674.9	411.8	88.00	6.00	0.00	0	0
										point102	102	670.3	415.8	88.00	6.00	0.00	0	0
										point103	103	668.1	413.2	88.00	6.00	0.00	0	0
										point104	104	666.8	414.3	88.00	6.00	0.00	0	0
										point105	105	662.9	409.7	88.00	6.00			
Barrier11		W	0.00	30.48	0.00				0.00	point165	165	687.1	600.9	67.50	4.50	0.00	0	0
										point166	166	702.2	597.3	67.50	4.50	0.00	0	0
										point167	167	703.4	601.6	67.50	4.50	0.00	0	0
										point168	168	709.8	600.1	67.50	4.50	0.00	0	0
										point169	169	709.4	598.5	67.50	4.50	0.00	0	0
										point170	170	713.0	597.5	67.50	4.50	0.00	0	0
										point171	171	710.8	588.7	67.50	4.50	0.00	0	0
										point172	172	711.9	588.5	67.50	4.50	0.00	0	0
										point173	173	723.7	588.6	67.50	4.50	0.00	0	0
										point174	174	723.8	580.6	67.50	4.50	0.00	0	0
										point175	175	716.3	580.6	67.50	4.50	0.00	0	0
										point176	176	716.4	582.8	67.50	4.50	0.00	0	0
										point177	177	709.9	584.3	67.50	4.50	0.00	0	0
										point178	178	709.7	584.0	67.50	4.50	0.00	0	0
										point179	179	697.7	586.9	67.50	4.50	0.00	0	0
										point180	180	698.3	589.6	67.50	4.50	0.00	0	0
										point181	181	691.1	591.2	67.50	4.50	0.00	0	0
										point182	182	690.4	589.0	67.50	4.50	0.00	0	0
										point183	183	684.2	590.4	67.50	4.50	0.00	0	0
										point184	184	687.1	600.9	67.50	4.50			
Barrier12		W	0.00	30.48	0.00				0.00	point185	185	832.9	601.5	66.50	4.50	0.00	0	0
										point186	186	831.2	585.8	66.50	4.50	0.00	0	0
										point187	187	806.7	587.4	66.50	4.50	0.00	0	0
										point188	188	805.9	573.9	66.50	4.50	0.00	0	0
										point189	189	830.2	572.4	66.50	4.50	0.00	0	0
										point190	190	829.5	558.0	66.50	4.50	0.00	0	0
										point191	191	842.8	557.1	66.50	4.50	0.00	0	0
										point192	192	844.9	587.0	66.50	4.50	0.00	0	0

## INPUT: BARRIERS

Yerba Buena Island 08080090.11

										point193	193	853.8	586.7	66.50	4.50	0.00	0	0
										point194	194	854.9	600.3	66.50	4.50	0.00	0	0
										point197	197	832.9	601.5	66.50	4.50			
Barrier13		W	0.00	30.48	0.00				0.00	point198	198	802.3	633.6	66.50	4.50	0.00	0	0
										point199	199	805.0	625.0	66.50	4.50	0.00	0	0
										point200	200	828.8	631.6	66.50	4.50	0.00	0	0
										point201	201	832.6	618.0	66.50	4.50	0.00	0	0
										point202	202	797.9	608.3	66.50	4.50	0.00	0	0
										point203	203	800.3	599.2	66.50	4.50	0.00	0	0
										point206	206	844.6	611.7	66.50	4.50	0.00	0	0
										point207	207	839.4	630.6	66.50	4.50	0.00	0	0
										point208	208	833.6	629.0	66.50	4.50	0.00	0	0
										point209	209	830.1	641.6	66.50	4.50	0.00	0	0
										point210	210	826.8	640.7	66.50	4.50	0.00	0	0
										point211	211	826.7	641.1	66.50	4.50	0.00	0	0
										point212	212	802.3	633.6	66.50	4.50			
Barrier14		W	0.00	30.48	0.00				0.00	point213	213	919.3	602.1	49.50	5.00	0.00	0	0
										point214	214	901.4	618.0	49.50	5.00	0.00	0	0
										point215	215	920.2	639.5	49.50	5.00	0.00	0	0
										point216	216	929.2	631.7	49.50	5.00	0.00	0	0
										point217	217	916.7	617.4	49.50	5.00	0.00	0	0
										point218	218	925.8	609.3	49.50	5.00	0.00	0	0
										point219	219	919.3	602.1	49.50	5.00			
Barrier15		W	0.00	30.48	0.00				0.00	point220	220	980.4	298.2	56.50	4.00	0.00	0	0
										point221	221	990.4	296.2	56.50	4.00	0.00	0	0
										point222	222	991.8	303.3	56.50	4.00	0.00	0	0
										point223	223	981.8	305.3	56.50	4.00	0.00	0	0
										point224	224	980.4	298.2	56.50	4.00			
Barrier16		W	0.00	30.48	0.00				0.00	point226	226	1,006.8	351.3	52.50	4.50	0.00	0	0
										point227	227	1,017.7	351.4	52.50	4.50	0.00	0	0
										point228	228	1,017.7	352.4	52.50	4.50	0.00	0	0
										point229	229	1,018.7	352.4	52.50	4.50	0.00	0	0
										point230	230	1,018.6	355.2	52.50	4.50	0.00	0	0
										point231	231	1,017.5	355.2	52.50	4.50	0.00	0	0
										point232	232	1,017.5	356.0	52.50	4.50	0.00	0	0
										point233	233	1,015.4	356.0	52.50	4.50	0.00	0	0
										point234	234	1,015.4	356.3	52.50	4.50	0.00	0	0
										point235	235	1,015.2	357.0	52.50	4.50	0.00	0	0
										point236	236	1,017.3	357.0	52.50	4.50	0.00	0	0
										point237	237	1,017.2	367.3	52.50	4.50	0.00	0	0
										point238	238	1,011.5	367.4	52.50	4.50	0.00	0	0
										point239	239	1,011.4	365.4	52.50	4.50	0.00	0	0
										point240	240	1,007.0	365.5	52.50	4.50	0.00	0	0
										point241	241	1,006.9	364.2	52.50	4.50	0.00	0	0
										point242	242	1,006.8	364.2	52.50	4.50	0.00	0	0
										point243	243	1,006.8	351.3	52.50	4.50			
Barrier17		W	0.00	30.48	0.00				0.00	point244	244	1,006.5	403.5	51.75	4.50	0.00	0	0
										point245	245	1,006.8	391.4	51.75	4.50	0.00	0	0
										point246	246	1,017.4	391.7	51.75	4.50	0.00	0	0











## INPUT: BARRIERS

Yerba Buena Island 0808090.11

										point394	394	1,167.0	636.9	3.50	5.00	0.00	0	0
										point395	395	1,167.0	638.0	3.50	5.00	0.00	0	0
										point396	396	1,169.9	638.0	3.50	5.00	0.00	0	0
										point397	397	1,169.5	650.0	3.50	5.00	0.00	0	0
										point398	398	1,162.1	649.0	3.50	5.00			
Barrier20		W	0.00	30.48	0.00				0.00	point399	399	906.6	754.5	25.00	6.00	0.00	0	0
										point400	400	907.3	762.7	25.00	6.00	0.00	0	0
										point401	401	927.6	761.5	25.00	6.00	0.00	0	0
										point402	402	927.1	753.1	25.00	6.00	0.00	0	0
										point403	403	926.5	751.1	25.00	6.00	0.00	0	0
										point404	404	907.3	752.3	25.00	6.00	0.00	0	0
										point405	405	907.3	754.4	25.00	6.00	0.00	0	0
										point406	406	906.6	754.5	25.00	6.00			
Barrier21		W	0.00	30.48	0.00				0.00	point407	407	928.1	762.3	25.00	6.00	0.00	0	0
										point408	408	927.3	751.1	25.00	6.00	0.00	0	0
										point409	409	938.9	750.2	25.00	6.00	0.00	0	0
										point410	410	939.6	761.6	25.00	6.00	0.00	0	0
										point411	411	928.1	762.3	25.00	6.00			
Barrier22		W	0.00	30.48	0.00				0.00	point412	412	895.1	803.1	26.00	6.00	0.00	0	0
										point413	413	890.1	791.1	26.00	6.00	0.00	0	0
										point414	414	891.7	790.5	26.00	6.00	0.00	0	0
										point415	415	893.3	789.8	26.00	6.00	0.00	0	0
										point416	416	899.8	787.2	26.00	6.00	0.00	0	0
										point417	417	904.7	799.3	26.00	6.00	0.00	0	0
										point418	418	895.1	803.1	26.00	6.00			
Barrier23		W	0.00	30.48	0.00				0.00	point420	420	905.6	821.8	26.00	6.00	0.00	0	0
										point421	421	898.7	810.7	26.00	6.00	0.00	0	0
										point422	422	907.8	804.7	26.00	6.00	0.00	0	0
										point423	423	911.7	811.0	26.00	6.00	0.00	0	0
										point424	424	912.7	810.4	26.00	6.00	0.00	0	0
										point425	425	914.4	813.2	26.00	6.00	0.00	0	0
										point426	426	913.4	813.8	26.00	6.00	0.00	0	0
										point427	427	914.8	815.9	26.00	6.00	0.00	0	0
										point428	428	905.6	821.8	26.00	6.00			
Barrier24		W	0.00	30.48	0.00				0.00	point430	430	941.3	815.9	25.00	6.00	0.00	0	0
										point431	431	931.0	820.5	25.00	6.00	0.00	0	0
										point432	432	930.9	820.5	25.00	6.00	0.00	0	0
										point433	433	929.9	818.2	25.00	6.00	0.00	0	0
										point434	434	928.4	818.9	25.00	6.00	0.00	0	0
										point435	435	929.3	821.3	25.00	6.00	0.00	0	0
										point436	436	928.9	821.4	25.00	6.00	0.00	0	0
										point437	437	932.8	830.6	25.00	6.00	0.00	0	0
										point438	438	935.9	829.3	25.00	6.00	0.00	0	0
										point439	439	936.3	830.1	25.00	6.00	0.00	0	0
										point440	440	936.9	829.8	25.00	6.00	0.00	0	0
										point441	441	937.8	831.8	25.00	6.00	0.00	0	0
										point442	442	943.1	829.5	25.00	6.00	0.00	0	0
										point443	443	942.2	827.4	25.00	6.00	0.00	0	0
										point444	444	942.6	827.2	25.00	6.00	0.00	0	0



**Yerba Buena Island 08080090.11**

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INPUT: TERRAIN LINES

EDAW/AECOM  
Maddux, B.

13 August 2009  
TNM 2.5

INPUT: TERRAIN LINES

PROJECT/CONTRACT:

Yerba Buena Island 08080090.11

RUN:

Future No Build

Terrain Line Name	Points			
	No.	Coordinates (ground)		Z
		X	Y	
		m	m	m
Terrain Line7	65	711.3	722.8	0.50
	66	708.4	693.7	10.00
	67	702.2	671.8	20.00
	68	697.4	656.0	30.00
	69	697.0	643.4	40.00
	70	698.4	633.3	50.00
	71	701.3	623.5	60.00
	72	701.6	614.8	66.50
	73	693.8	610.9	67.00
	74	775.9	636.9	66.00
Terrain Line8	75	776.0	652.2	60.00
	76	760.7	664.5	50.00
	77	749.2	666.9	40.00
	78	745.1	679.7	32.00
	79	741.0	692.2	20.00
	80	736.4	708.9	10.00
	81	728.9	726.6	0.50
	82	793.5	779.6	0.50
	83	804.9	734.8	30.00
	84	891.8	737.7	26.50
Terrain Line10	85	880.2	742.8	25.00
	86	857.1	753.1	24.00
	87	849.0	763.4	14.00
	88	835.4	783.9	4.00

## INPUT: TERRAIN LINES

Yerba Buena Island 08080090.11

	89	835.0	795.2	0.50
Terrain Line11	90	855.1	809.6	0.50
	91	871.4	775.5	24.50
Terrain Line12	92	860.0	843.5	0.50
	93	880.1	821.7	20.00
Terrain Line13	94	882.2	862.6	0.50
	95	902.1	845.4	18.00
Terrain Line14	96	919.8	882.0	0.50
	97	927.1	861.2	16.00
Terrain Line15	98	940.8	864.0	16.00
	99	946.0	867.4	14.00
	100	949.1	881.7	8.00
	101	945.2	890.5	4.00
	102	937.9	894.6	0.50
Terrain Line16	103	968.5	886.1	0.50
	104	962.0	868.2	15.00
Terrain Line17	105	1,029.6	900.0	0.50
	106	1,031.9	878.5	12.00
Terrain Line19	109	927.7	853.3	18.00
	110	926.5	838.9	24.00
	111	926.7	832.6	25.50
Terrain Line20	112	959.6	860.0	15.50
	113	949.0	832.9	24.50
Terrain Line21	114	886.1	821.0	22.00
	115	888.6	814.3	24.00
	116	891.7	812.4	25.00
	117	898.1	806.1	26.00
Terrain Line22	118	880.7	778.3	26.00
	119	888.4	777.8	26.50
	120	889.8	777.7	27.50
	121	899.3	778.8	28.00
	122	912.4	784.1	29.00
Terrain Line23	123	900.8	756.4	26.00
	124	903.3	772.2	28.00
	125	913.2	783.0	29.00
Terrain Line24	126	915.3	796.2	26.00

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INPUT: TERRAIN LINES

		127	909.5	798.3	26.50
Terrain Line25		128	923.4	816.5	25.50
		129	923.6	813.4	27.00
		130	920.9	806.0	28.50
Terrain Line26		131	942.4	802.0	23.50
		132	935.6	803.3	26.50
		133	924.8	803.3	29.00
Terrain Line27		134	956.2	754.4	22.50
		135	948.0	764.3	23.50
		136	920.0	791.6	28.50
Terrain Line28		137	948.3	789.6	22.50
		138	942.9	787.8	26.00
Terrain Line29		139	954.5	822.7	24.50
		140	968.2	849.7	18.00
		141	985.8	861.3	13.50
		142	999.7	860.6	12.00
		143	1,026.4	859.3	11.00
		144	1,055.7	857.9	10.00
		145	1,071.0	858.7	9.50
Terrain Line31		146	1,027.1	836.6	11.50
		147	1,027.0	825.3	12.30
		148	1,025.8	810.2	11.50
Terrain Line32		149	1,054.2	841.3	11.50
		150	1,048.9	825.2	14.50
		151	1,050.8	811.9	12.00
		152	1,057.4	801.8	13.50
		153	1,063.4	797.9	11.50
Terrain Line33		154	932.1	688.7	39.00
		155	956.4	742.7	21.50
		156	990.1	750.3	20.50
		157	1,026.9	772.0	12.50
		158	1,050.9	792.9	11.50
		159	1,057.4	801.8	13.50
		160	1,064.4	802.2	12.00
		161	1,074.7	807.4	11.50
Terrain Line34		162	966.2	674.6	40.00



## INPUT: TERRAIN LINES

	163	983.7	710.3	21.00
	164	1,004.9	721.9	20.00
	165	1,019.3	727.2	18.00
	166	1,042.4	744.5	12.50
Terrain Line35	167	1,017.7	792.0	12.50
	168	996.2	786.0	18.50
	169	987.8	784.8	19.50
	170	979.8	783.7	20.50
	171	975.4	779.9	21.00
Terrain Line36	172	856.1	611.5	65.00
	173	895.4	623.0	57.50
	174	914.7	642.0	54.00
	175	922.7	641.4	52.00
	176	931.7	640.2	50.00
	177	943.2	632.3	48.00
Terrain Line37	178	886.6	610.1	58.00
	179	901.9	613.2	55.00
Terrain Line38	180	859.1	594.6	64.00
	181	875.4	593.9	60.00
	182	887.3	593.4	58.50
	183	901.8	591.4	56.00
Terrain Line39	184	783.7	476.6	87.00
	185	782.5	486.0	86.00
	186	790.7	502.0	82.00
	187	813.2	518.4	74.00
	188	820.2	527.2	70.00
	189	868.0	552.1	61.50
	190	885.8	570.3	58.70
	191	902.3	588.3	56.00
	192	914.6	597.3	54.00
Terrain Line46	214	793.0	430.2	103.00
	215	809.1	428.4	100.00
	216	827.3	439.8	89.00
	217	830.3	442.6	89.00
	218	838.8	456.3	72.00
	219	841.2	459.3	70.00

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INPUT: TERRAIN LINES

		220	838.5	469.1	69.00
Terrain Line47		221	782.1	440.8	103.50
		222	783.7	442.4	102.00
		223	797.3	470.1	88.00
		224	797.5	475.2	88.00
		225	804.3	488.2	80.00
		226	817.6	492.0	73.00
		227	829.5	495.4	66.00
		228	846.2	497.2	56.00
Terrain Line49		229	730.1	434.6	103.50
		230	708.8	445.6	100.00
		231	690.7	458.1	96.00
		232	674.2	481.7	90.00
		233	672.0	486.3	88.00
Terrain Line60		283	810.9	312.7	64.00
		284	809.0	344.2	83.00
		285	809.5	347.6	83.00
		286	807.3	368.4	91.00
		287	807.8	373.3	92.00
		288	810.8	387.2	96.00
		289	812.9	395.1	100.00
		290	810.2	400.2	100.50
		291	808.0	415.5	101.00
Terrain Line61		292	842.9	392.4	100.00
		293	927.1	293.8	64.00
Terrain Line62		294	840.9	400.5	100.00
		295	892.0	398.3	88.00
		296	910.4	418.5	78.00
		297	921.7	445.7	68.00
		298	914.4	475.3	57.00
Terrain Line63		299	840.9	400.5	100.00
		300	862.6	407.0	94.00
		301	868.2	413.8	88.60
		302	869.7	417.8	83.30
		303	871.2	429.8	78.00
		304	867.6	448.9	69.00

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	305	867.2	458.6	60.00
	306	857.5	463.5	56.00
Terrain Line64	307	704.4	355.8	74.00
	308	720.8	337.9	45.00
Terrain Line65	309	704.8	353.7	73.00
	310	691.7	331.7	35.00
	311	642.7	268.9	28.00
	312	605.9	215.3	1.00
Terrain Line67	320	736.6	323.7	45.00
	321	764.3	305.5	63.50
Terrain Line68	322	637.9	185.4	28.00
	323	686.6	239.3	35.00
	324	725.5	278.7	50.00
	325	762.6	303.1	63.50
Terrain Line91	396	1,381.1	887.8	2.50
	397	1,388.2	888.0	0.50
Terrain Line92	398	1,255.4	835.2	4.80
	399	1,275.9	841.3	4.00
	400	1,302.6	857.7	21.50
	401	1,310.6	860.4	21.60
	402	1,319.0	863.7	21.80
	403	1,326.4	866.5	22.00
	404	1,342.1	870.6	8.00
	405	1,350.6	876.0	6.00
	406	1,359.8	876.3	3.50
Terrain Line93	407	1,374.2	884.6	3.50
	408	1,381.9	877.2	0.50
Terrain Line94	409	1,375.4	878.4	0.50
	410	1,370.7	880.7	3.50
Terrain Line95	411	1,367.1	875.0	3.50
	412	1,369.1	869.7	0.50
Terrain Line96	413	1,365.4	864.5	0.50
	414	1,361.8	867.1	3.00
Terrain Line97	415	1,359.7	853.1	0.50
	416	1,357.2	857.0	3.00
Terrain Line98	417	1,326.7	861.5	22.00



	418	1,336.5	858.0	6.00
	419	1,344.5	855.0	3.50
Terrain Line101	420	1,361.6	847.0	0.50
	421	1,353.4	848.2	3.00
Terrain Line104	520	1,229.0	777.5	2.80
	521	1,213.2	761.4	4.50
	522	1,205.9	754.1	2.50
Terrain Line105	523	1,215.0	782.3	3.00
	524	1,205.8	777.1	5.50
Terrain Line106	525	1,180.2	792.7	7.00
	526	1,189.0	800.8	4.00
	527	1,194.2	799.2	3.50
Terrain Line107	528	1,194.9	244.3	0.50
	529	1,185.4	457.2	0.50
	530	1,235.9	464.7	0.50
	531	1,266.6	541.5	0.50
	532	1,257.8	544.8	0.50
	533	1,229.2	473.2	0.50
	534	1,227.5	473.0	0.50
	535	1,199.6	469.0	0.50
	536	1,180.9	466.2	0.50
	537	1,180.3	469.1	0.50
	538	1,174.9	498.9	0.50
	539	1,173.2	509.1	0.50
	540	1,173.2	512.1	0.50
	541	1,172.0	518.2	0.50
	542	1,171.9	521.6	0.50
	543	1,171.4	525.3	0.50
	544	1,171.3	529.7	0.50
	545	1,172.5	531.1	0.50
	546	1,172.3	533.2	0.50
	547	1,172.1	539.1	0.50
	548	1,171.6	541.1	0.50
	549	1,172.0	544.4	0.50
	550	1,173.2	555.6	0.50
	551	1,174.5	564.4	0.50

	552	1,175.3	573.2	0.50
	553	1,179.6	585.3	0.50
	554	1,183.1	596.3	0.50
	555	1,187.5	611.4	0.50
	556	1,187.8	614.8	0.50
	557	1,189.4	622.0	0.50
	558	1,189.8	623.7	0.50
	559	1,188.6	625.3	0.50
	560	1,188.8	627.1	0.50
	561	1,189.2	630.8	0.50
	562	1,190.0	632.5	0.50
	563	1,190.4	636.0	0.50
	564	1,190.3	639.4	0.50
	565	1,190.7	642.2	0.50
	566	1,191.1	647.4	0.50
	567	1,191.1	650.2	0.50
	568	1,191.0	654.0	0.50
	569	1,190.9	659.3	0.50
	570	1,191.1	662.8	0.50
	571	1,191.1	666.6	0.50
	572	1,190.2	668.1	0.50
	573	1,190.2	672.3	0.50
	574	1,190.4	679.4	0.50
	575	1,190.5	682.7	0.50
	576	1,190.9	685.9	0.50
	577	1,191.2	690.0	0.50
	578	1,191.4	692.6	0.50
	579	1,191.9	695.6	0.50
	580	1,192.7	700.8	0.50
	581	1,194.1	706.5	0.50
	582	1,195.5	712.2	0.50
	583	1,196.9	715.2	0.50
	584	1,197.2	717.2	0.50
	585	1,197.8	718.6	0.50
	586	1,200.2	720.8	0.50
	587	1,203.2	727.2	0.50

	588	1,204.1	729.8	0.50
	589	1,212.5	738.1	0.50
	590	1,221.0	746.1	0.50
	591	1,227.9	752.4	0.50
	592	1,233.7	756.7	0.50
	593	1,244.8	764.6	0.50
	594	1,255.9	773.7	0.50
	595	1,258.1	775.0	0.50
	596	1,268.6	782.8	0.50
	597	1,280.0	790.9	0.50
	598	1,290.3	796.6	0.50
	599	1,303.1	804.8	0.50
	600	1,318.1	815.1	0.50
	601	1,324.4	818.4	0.50
	602	1,326.2	819.1	0.50
	603	1,327.8	819.2	0.50
	604	1,328.8	820.6	0.50
	605	1,330.4	820.3	0.50
	606	1,331.8	820.1	0.50
	607	1,332.5	818.7	0.50
	608	1,333.9	817.7	0.50
	609	1,335.2	818.5	0.50
	610	1,336.7	816.7	0.50
	611	1,337.6	815.9	0.50
	612	1,338.2	817.1	0.50
	613	1,337.6	818.8	0.50
	614	1,338.6	820.7	0.50
	615	1,341.8	822.5	0.50
	616	1,344.5	824.8	0.50
	617	1,349.8	825.0	0.50
	618	1,354.6	825.1	0.50
	619	1,358.7	826.3	0.50
	620	1,359.3	825.9	0.50
	621	1,365.3	836.6	0.50
	622	1,364.1	838.4	0.50
	623	1,362.9	840.3	0.50



	624	1,363.1	841.5	0.50
	625	1,360.5	844.2	0.50
Terrain Line108	626	1,181.9	757.8	6.50
	627	1,176.6	759.9	7.00
	628	1,166.9	766.8	8.00
Terrain Line109	629	1,163.8	737.6	3.50
	630	1,166.1	743.2	4.00
	631	1,167.8	756.3	7.00
Terrain Line110	632	1,124.1	751.2	4.50
	633	1,137.2	754.8	8.00
	634	1,149.2	753.7	8.50
	635	1,148.0	748.0	7.50
	636	1,154.0	741.7	5.00
	637	1,158.8	736.2	3.50
Terrain Line111	638	1,121.0	740.9	8.00
	639	1,117.9	735.8	8.00
	640	1,117.5	726.6	7.50
	641	1,116.9	722.0	6.50
	642	1,118.4	712.7	3.50
Terrain Line112	643	1,105.0	721.6	3.50
	644	1,103.1	731.0	8.00
Terrain Line113	633	1,072.7	688.4	8.00
	646	1,078.7	687.3	3.00
	647	1,107.3	690.7	2.60
Terrain Line114	648	990.9	602.5	46.00
	649	1,048.9	663.1	8.00
	650	1,064.8	669.3	7.80
	651	1,069.6	668.8	7.50
	652	1,079.5	670.4	5.00
	653	1,087.5	672.6	4.00
	654	1,104.2	674.3	3.00
Terrain Line115	655	1,038.5	622.4	10.00
	656	1,057.4	641.7	7.00
	657	1,068.2	649.1	6.50
	658	1,078.2	648.0	3.50
	659	1,082.0	647.3	3.00

# INPUT: TERRAIN LINES

Yerba Buena Island 08080090.11

Terrain Line116	660	1,071.2	619.8	3.00
	661	1,063.3	619.9	6.50
Terrain Line117	662	1,061.5	576.9	6.00
	663	1,064.6	593.9	6.00
	664	1,067.4	607.7	6.00
	665	1,070.8	617.6	6.00
Terrain Line118	666	982.9	544.4	49.00
	667	989.3	547.7	46.00
	668	999.8	555.6	46.00
	669	1,023.7	579.9	20.00
	670	1,038.7	588.3	10.00
	671	1,046.4	597.4	6.50
	672	1,062.2	594.6	6.00
Terrain Line119	673	1,007.5	504.4	47.50
	674	1,010.6	494.7	44.00
	675	1,014.9	493.3	43.50
	676	1,023.2	496.8	43.00
	677	1,069.9	515.7	10.00
	678	1,074.4	517.6	5.50
Terrain Line120	679	992.9	400.8	58.00
	680	1,006.1	412.7	50.00
	681	1,015.3	422.6	48.00
	682	1,023.7	431.6	46.00
	683	1,058.4	447.9	32.00
	684	1,083.4	468.6	10.00
	685	1,096.7	481.6	4.50
Terrain Line121	687	1,022.2	407.4	50.00
	688	1,055.4	413.0	40.00
	689	1,100.5	418.5	30.00
	690	1,136.9	455.0	3.50
Terrain Line122	691	1,028.9	370.3	48.00
	692	1,022.0	367.3	52.00
Terrain Line123	693	1,022.3	356.0	52.00
	694	1,030.1	356.4	48.00
	695	1,045.4	357.6	44.00
	696	1,111.6	368.9	30.00

INPUT: TERRAIN LINES

	697	1,139.3	352.0	3.50
Terrain Line124	698	931.8	287.3	63.00
	699	939.6	267.2	52.00
Terrain Line125	700	623.1	170.0	0.50
	701	655.3	163.2	0.50
	702	675.3	159.5	0.50
	703	720.1	166.3	0.50
	704	767.8	185.0	0.50
	705	817.2	188.4	0.50
	706	841.6	182.2	0.50
	707	858.7	164.0	0.50
	708	870.5	170.5	0.50
	709	933.0	169.7	0.50
	710	1,000.2	168.9	0.50
	711	1,029.7	161.6	0.50
	712	1,045.0	146.3	0.50
	713	1,064.6	126.7	0.50
	714	1,089.9	124.5	0.50
	715	1,113.2	129.6	0.50
	716	1,123.2	150.0	0.50
	717	1,133.4	182.6	0.50
	718	1,147.6	197.2	0.50
	719	1,158.0	201.2	0.50
	720	1,157.6	215.4	0.50
	721	1,182.2	241.8	0.50
Terrain Line126	722	873.5	285.5	60.00
	723	852.1	231.5	43.50
Terrain Line127	724	774.2	202.5	32.00
	725	771.7	229.2	39.00
	726	773.0	258.5	45.50
	727	783.0	281.8	50.00
	728	789.5	299.9	62.00
Terrain Line128	729	731.2	322.8	62.00
	730	585.5	155.4	62.00
	731	573.6	173.9	62.00
	732	714.3	330.2	62.00



INPUT: TERRAIN LINES

Yerba Buena Island 08080090.11

Terrain Line129	733	731.8	322.4	45.00
	734	585.4	154.2	45.00
	735	572.8	174.0	45.00
	736	713.8	330.7	45.00
Terrain Line99-Terrain Line100	749	1,316.3	855.7	22.00
	750	1,317.0	850.3	12.00
	751	1,318.4	839.6	3.50
Terrain Line40	752	735.6	450.1	103.50
	753	732.8	482.9	90.00
	754	747.1	487.5	86.50
	755	749.9	491.1	86.50
	756	750.6	493.1	86.50
	757	764.3	531.7	78.50
	758	759.0	550.4	75.50
	759	770.9	561.9	75.50
	760	769.7	567.1	74.00
	761	779.4	574.5	70.00
	762	790.9	603.2	68.00
Terrain Line30	763	1,079.1	831.3	11.00
	764	1,073.5	831.0	12.50
	765	1,060.1	827.9	13.50
	766	1,048.9	825.2	14.50
	767	1,039.4	825.3	13.50
	768	1,027.0	825.3	12.30
	769	1,014.9	823.9	11.80
	770	1,001.2	822.3	11.00
Terrain Line136	771	1,194.0	244.3	3.00
	772	1,184.9	457.6	3.00
	773	1,235.6	465.2	3.00
	774	1,266.0	541.2	3.00
	775	1,258.1	544.2	3.00
	776	1,229.6	472.7	3.00
	777	1,227.5	472.5	3.00
	778	1,199.7	468.5	3.00
	779	1,180.5	465.6	3.00
	780	1,179.8	469.0	3.00

	781	1,174.4	498.8	3.00
	782	1,172.7	509.1	3.00
	783	1,170.0	515.1	3.00
	784	1,169.7	519.3	3.00
	785	1,169.5	522.3	3.00
	786	1,168.3	525.4	3.00
	787	1,167.7	530.6	3.00
	788	1,167.4	534.2	3.00
	789	1,167.7	537.6	3.00
	790	1,168.1	540.8	3.00
	791	1,168.3	543.9	3.00
	792	1,167.8	546.3	3.00
	793	1,168.9	554.7	3.00
	794	1,170.9	566.0	3.00
	795	1,171.4	572.0	3.00
	796	1,173.6	580.4	3.00
	797	1,177.0	592.0	3.00
	798	1,181.4	606.3	3.00
	799	1,183.0	615.2	3.00
	800	1,183.4	622.6	3.00
	801	1,183.2	631.3	3.00
	802	1,183.4	633.6	3.00
	803	1,182.4	643.8	3.00
	804	1,183.0	646.5	3.00
	805	1,183.1	647.2	3.00
	806	1,184.0	655.7	3.00
	807	1,184.1	658.5	3.00
	809	1,184.2	660.1	3.00
	810	1,184.2	662.9	3.00
	811	1,184.1	666.7	3.00
	812	1,184.0	672.0	3.00
	813	1,184.2	675.5	3.00
	814	1,184.2	679.2	3.00
	815	1,183.3	680.6	3.00
	816	1,183.3	685.0	3.00
	817	1,183.9	690.2	3.00

	818	1,184.7	693.7	3.00
	819	1,186.4	697.2	3.00
	820	1,187.6	700.5	3.00
	821	1,188.5	704.7	3.00
	822	1,189.7	709.4	3.00
	823	1,190.3	712.9	3.00
	824	1,191.0	717.3	3.00
	825	1,192.2	721.2	3.00
	826	1,193.7	722.0	3.00
	827	1,194.4	723.6	3.00
	828	1,194.7	725.8	3.00
	829	1,194.2	728.5	3.00
	830	1,197.8	728.0	3.00
	831	1,199.9	731.9	3.00
	832	1,202.7	736.9	3.00
	833	1,205.2	742.3	3.00
	834	1,205.9	747.6	3.00
	835	1,209.3	752.7	3.00
	836	1,223.2	764.8	3.00
	837	1,229.4	767.7	3.00
	838	1,239.2	775.1	3.00
	839	1,257.9	788.1	3.00
	840	1,262.4	791.9	3.00
	841	1,267.0	794.0	3.00
	842	1,272.5	799.6	3.00
	843	1,294.5	811.0	3.00
	844	1,305.7	815.9	3.00
	845	1,312.6	820.8	3.00
	846	1,318.8	823.7	3.00
	847	1,323.2	825.6	3.00
	848	1,325.4	826.1	3.00
	849	1,333.6	825.3	3.00
	850	1,334.4	825.7	3.00
	851	1,335.4	827.4	3.00
	852	1,337.0	828.7	3.00
	853	1,338.4	828.8	3.00



INPUT: TERRAIN LINES

Yerba Buena Island 08080090.11

	854	1,340.0	826.6	3.00
	855	1,344.4	825.1	3.00
	856	1,351.7	829.0	3.00
	857	1,359.1	833.1	3.00
	858	1,361.3	834.5	3.00
	864	1,360.8	836.6	3.00
	865	1,355.7	842.5	3.00
	868	1,354.4	844.7	3.00
Terrain Line137	869	993.1	522.3	48.00
	872	992.3	505.4	50.00
	873	992.1	495.6	52.00
	874	990.7	485.9	52.50
	875	990.2	474.8	53.00
	876	989.5	445.6	55.00
	877	992.4	419.6	58.00
	878	990.0	376.3	61.00
	879	989.9	347.9	62.00
	880	995.0	340.8	58.00
	881	998.9	335.5	57.00
	882	1,000.8	332.5	56.50
	871	1,002.4	329.8	56.00
Terrain Line138	883	1,002.5	407.0	52.00
	884	1,005.9	407.0	51.80
	885	1,015.3	407.0	51.80
	886	1,020.0	405.4	51.80
	887	1,021.9	402.4	51.80

INPUT: GROUND ZONES

EDAW/AECOM  
Maddux, B.

13 August 2009  
TNM 2.5

INPUT: GROUND ZONES

PROJECT/CONTRACT:

Yerba Buena Island 08080090.11

RUN:

Future No Build

Ground Zone		Points			
Name	Type	Flow Resistivity cgs rayls	No.	Coordinates	
				X	Y
				m	m
Ground Zone2	Lawn	300	1	989.3	451.3
			2	1,012.7	474.3
			3	1,043.0	472.6
			4	1,043.0	355.9
			5	1,110.3	368.6
			6	1,129.9	447.9
			7	1,096.2	481.1
			8	1,060.4	577.4
			9	1,071.9	619.1
			10	1,100.9	658.5
			11	1,050.6	684.5
			12	1,018.3	639.8
			13	991.4	604.4
			14	979.9	582.2
			15	979.9	558.8
			16	985.5	546.9
			17	995.7	517.9
			18	994.0	494.9

## RESULTS: SOUND LEVELS

Yerba Buena Island 08080090.11

EDAW/AECOM  
Maddux, B.21 October 2009  
TNM 2.5  
Calculated with TNM 2.5

## RESULTS: SOUND LEVELS

PROJECT/CONTRACT:

Yerba Buena Island 08080090.11

RUN:

Future No Build

BARRIER DESIGN:

INPUT HEIGHTS

Average pavement type shall be used unless  
a State highway agency substantiates the use  
of a different type with approval of FHWA.

ATMOSPHERICS:

20 deg C, 50% RH

Receiver																
Name	No.	#DUs	Existing LAeq1h	No Barrier		Increase over existing				Type Impact	With Barrier		Noise Reduction		Calculated minus Goal	
				LAeq1h	Calculated	Crit'n	Calculated	Crit'n Sub'l Inc	Calculated LAeq1h		Calculated	Goal				
			dBA	dBA		dBA	dB		dB		dBA	dB	dB	dB	dB	
R-1		9	1	0.0	67.1	71	67.1	12	----		67.1	0.0	5		-5.0	
R-2 (ST-1)		16	1	0.0	67.4	71	67.4	12	----		67.4	0.0	5		-5.0	
R-3		17	1	0.0	73.1	66	73.1	12	Snd Lvl		73.1	0.0	5		-5.0	
R-4 (ST-3)		18	1	0.0	66.3	71	66.3	12	----		66.3	0.0	5		-5.0	
R-5		19	1	0.0	66.5	71	66.5	12	----		66.5	0.0	5		-5.0	
R-6		20	1	0.0	65.9	66	65.9	12	----		65.9	0.0	5		-5.0	
R-7		21	1	0.0	66.7	66	66.7	12	Snd Lvl		66.7	0.0	5		-5.0	
R-8		22	1	0.0	63.5	66	63.5	12	----		63.5	0.0	5		-5.0	
R-9		24	1	0.0	62.4	66	62.4	12	----		62.4	0.0	5		-5.0	
R-10 (ST-2)		25	1	0.0	65.1	72	65.1	12	----		65.1	0.0	5		-5.0	
R-11		38	1	0.0	53.4	66	53.4	12	----		53.4	0.0	5		-5.0	
R-12 (ST-4)		39	1	0.0	65.4	66	65.4	12	----		65.4	0.0	5		-5.0	
R-13 (ST-5)		40	1	0.0	57.5	66	57.5	12	----		57.5	0.0	5		-5.0	
R-14		41	1	0.0	65.3	66	65.3	12	----		65.3	0.0	5		-5.0	
R-15		42	1	0.0	63.5	66	63.5	12	----		63.5	0.0	5		-5.0	
R-16		43	1	0.0	72.1	71	72.1	12	Snd Lvl		72.1	0.0	5		-5.0	
R-17		54	1	0.0	60.8	71	60.8	12	----		60.8	0.0	5		-5.0	

Dwelling Units		# DUs		Noise Reduction		Max	
				Min	Avg	Avg	Max
				dB	dB	dB	dB
All Selected		17	0.0	0.0	0.0	0.0	0.0
All Impacted		3	0.0	0.0	0.0	0.0	0.0
All that meet NR Goal		0	0.0	0.0	0.0	0.0	0.0



EDAW/AECOM  
Maddux, B.

13 August 2009  
TNM 2.5

INPUT: ROADWAYS

PROJECT/CONTRACT:

Yerba Buena Island 08080090.11

RUN:

Future Alternative 2B

Average pavement type shall be used unless  
a State highway agency substantiates the use  
of a different type with the approval of FHWA

Roadway		Points											
Name	Width	Name	No.	Coordinates (pavement)			Flow Control			Segment			
				X	Y	Z	Control Device	Speed Constraint	Percent Vehicles Affected	Pvmt Type	On Struct?		
	m			m	m	m				km/h	%		
SFOBB WB OFF SE	3.7	point82	70	971.1	592.8	58.00						Average	
		point81	71	929.3	546.5	57.00						Average	
		point80	72	884.6	498.2	57.00						Average	
		point79	73	884.0	493.9	57.00						Average	
		point78	74	885.1	490.1	57.00						Average	
		point77	75	887.5	487.3	57.00						Average	
		point76	76	899.1	483.8	57.00						Average	
		point75	77	914.4	479.1	57.00						Average	
		point74	78	929.8	473.0	56.50						Average	
SFOBB EB OFF SE	3.7	point73	79	943.5	465.6	56.00							
		point96	80	886.6	496.7	58.00						Average	
		point95	81	919.4	524.9	51.20						Average	
		point94	82	925.7	530.1	51.30						Average	
		point93	83	946.1	550.2	51.50						Average	
		point92	84	949.8	552.6	51.50						Average	
		point91	85	952.0	553.6	51.50						Average	
		point90	86	958.8	555.0	51.50						Average	
		point89	87	963.5	554.4	51.20						Average	
		point88	88	966.9	553.3	51.00						Average	
		point87	89	970.1	551.7	50.80						Average	
		point86	90	977.5	545.3	50.50						Average	
		point85	91	979.9	542.2	50.00						Average	
		point84	92	982.5	534.0	49.50						Average	
		point83	93	986.4	520.0	48.00							
	3.7	point137	118	988.1	521.8	48.00	Onramp	0.00			100	Average	
	SFOBB EB ON SE												

		point136	119	984.2	536.2	49.50	Average
		point135	120	980.5	547.6	50.50	Average
		point134	121	976.7	558.8	51.00	Average
		point133	122	974.1	567.2	51.50	Average
		point132	123	973.6	572.5	51.50	Average
		point131	124	974.0	578.1	51.40	Average
		point130	125	974.6	580.7	51.40	Average
		point129	126	975.7	584.7	51.30	Average
		point128	127	981.1	597.1	51.40	Average
		point127	128	987.9	608.4	51.50	Average
		point126	129	995.6	619.1	51.70	Average
		point125	130	1,008.7	635.6	51.90	Average
		point124	131	1,018.4	646.7	52.00	Average
Forest Rd - 1	3.7	point370	354	623.6	468.2	92.00	Average
		point369	355	624.3	463.0	92.50	Average
		point368	356	629.2	458.1	92.00	Average
		point367	357	639.7	452.1	91.00	Average
		point366	358	653.3	443.1	90.50	Average
		point365	359	657.8	439.3	90.00	Average
		point364	360	673.3	420.0	90.00	Average
		point363	361	678.0	415.8	90.00	Average
		point362	362	693.7	404.9	90.00	Average
		point361	363	712.9	394.2	91.00	Average
		point360	364	731.8	386.5	90.00	Average
Forest Rd - 2	3.7	point371	365	732.6	388.4	90.00	Average
		point372	366	713.7	396.1	91.00	Average
		point373	367	694.7	406.6	90.00	Average
		point374	368	679.3	417.4	90.00	Average
		point375	369	674.7	421.4	90.00	Average
		point376	370	659.2	440.7	90.00	Average
		point377	371	654.5	444.7	90.50	Average
		point378	372	640.8	453.8	90.00	Average
		point379	373	630.4	459.7	92.00	Average
		point380	374	626.2	463.9	92.50	Average
		point381	375	625.6	468.5	92.00	Average
Signal Rd - 1	3.7	point394	376	628.6	466.7	92.00	Average
		point393	377	641.6	461.7	91.50	Average
		point392	378	668.2	456.6	94.50	Average
		point391	379	674.0	454.2	94.80	Average

			point390	380	708.1	430.4	98.00		Average
			point389	381	752.6	412.0	99.50		Average
			point388	382	762.9	408.4	100.20		Average
			point387	383	777.7	407.1	101.50		Average
			point386	384	789.1	412.5	102.50		Average
			point385	385	792.9	422.4	103.00		Average
			point384	386	789.3	432.7	103.20		Average
			point383	387	781.8	439.0	103.50		Average
			point382	388	764.6	441.0	103.80		
Signal Rd - 2	3.7		point406	389	764.6	438.7	103.80		Average
			point405	390	781.7	436.9	103.50		Average
			point404	391	787.9	431.6	103.20		Average
			point403	392	790.4	422.7	103.00		Average
			point402	393	786.8	414.4	102.50		Average
			point401	394	777.5	410.1	101.50		Average
			point400	395	762.9	411.2	100.20		Average
			point399	396	708.5	432.8	98.00		Average
			point398	397	675.4	456.1	94.80		Average
			point397	398	668.9	458.7	94.50		Average
			point396	399	641.9	463.8	91.50		Average
			point395	400	629.9	468.6	92.00		
SFOBB WB - 3	7.3		point668	668	1,553.4	1,058.5	58.00		Average
			point667	667	1,444.4	1,022.8	58.00		Average
			point666	666	1,355.7	983.9	58.00		Average
			point626	626	1,266.5	925.5	58.50		Average
			point625	625	1,244.7	909.5	59.70		Average
			point624	624	1,209.3	881.4	59.80		Average
			point623	623	1,184.1	859.5	60.00		Average
			point622	622	1,141.5	818.3	60.20		Average
			point621	621	1,112.6	787.8	60.50		Average
			point620	620	1,083.8	753.4	60.40		Average
			point619	619	1,061.4	723.7	60.20		Average
			point618	618	1,048.6	705.0	60.00		Average
			point617	617	988.2	619.9	56.70		Average
			point616	616	969.4	597.5	56.60		Average
			point615	615	951.9	577.6	56.50		Average
			point614	614	864.5	478.7	56.00		Average
			point613	613	851.3	463.7	56.00		
SFOBB WB - 2	7.3		point664	664	1,551.8	1,063.3	58.00		Average



		point663	663	1,442.4	1,028.5	58.00	Average	Y
		point662	662	1,352.8	990.0	58.00	Average	Y
		point612	612	1,262.4	931.1	58.50	Average	Y
		point611	611	1,240.5	915.1	59.70	Average	Y
		point610	610	1,204.9	886.8	59.80	Average	Y
		point609	609	1,179.4	864.6	60.00	Average	Y
		point608	608	1,136.5	823.2	60.20	Average	Y
		point607	607	1,107.4	792.4	60.50	Average	Y
		point606	606	1,078.4	757.7	60.40	Average	Y
		point605	605	1,055.8	727.8	60.20	Average	Y
		point604	604	1,042.9	709.0	60.00	Average	Y
		point603	603	982.7	624.2	56.70	Average	Y
		point602	602	964.2	602.1	56.60	Average	Y
		point601	601	946.6	582.2	56.50	Average	Y
		point600	600	859.3	483.3	56.00	Average	Y
		point599	599	846.0	468.3	56.00		
SFOBB WB - 1	7.3	point660	660	1,551.3	1,067.4	58.00	Average	
		point659	659	1,441.3	1,033.4	58.00	Average	Y
		point658	658	1,351.6	995.1	58.00	Average	Y
		point596	596	1,258.3	936.8	58.50	Average	Y
		point595	595	1,236.2	920.6	59.70	Average	Y
		point594	594	1,200.4	892.2	59.80	Average	Y
		point593	593	1,174.7	869.8	60.00	Average	Y
		point592	592	1,131.5	828.1	60.20	Average	Y
		point591	591	1,102.2	797.1	60.50	Average	Y
		point590	590	1,072.9	762.1	60.40	Average	Y
		point589	589	1,050.1	731.9	60.20	Average	Y
		point588	588	1,037.2	713.0	60.00	Average	Y
		point587	587	977.1	628.5	56.70	Average	Y
		point586	586	958.9	606.6	56.60	Average	Y
		point585	585	941.4	586.9	56.50	Average	Y
		point584	584	854.1	487.9	56.00	Average	Y
		point583	583	840.8	473.0	56.00		
SFOBB EB - 1	7.3	point636	636	841.0	470.8	50.00	Average	Y
		point635	635	885.6	521.5	51.50	Average	Y
		point634	634	925.6	563.7	53.00	Average	Y
		point633	633	997.7	646.8	53.50	Average	Y
		point632	632	1,070.2	729.7	53.70	Average	Y
		point631	631	1,114.7	775.7	54.00	Average	Y

			point630	630	1,133.8	791.6	54.50	Average	Y
			point629	629	1,181.8	828.2	55.00	Average	Y
			point628	628	1,216.2	857.6	55.50	Average	Y
			point669	669	1,279.1	904.6	56.00	Average	Y
			point670	670	1,371.5	962.9	56.50	Average	Y
			point671	671	1,457.8	999.3	56.70	Average	Y
			point672	672	1,564.3	1,032.9	57.00		
SFOBB EB - 2	7.3		point646	646	846.3	466.2	50.00	Average	Y
			point645	645	890.8	516.8	51.50	Average	Y
			point644	644	930.7	559.0	53.00	Average	Y
			point643	643	1,003.0	642.2	53.50	Average	Y
			point642	642	1,075.3	725.0	53.70	Average	Y
			point641	641	1,119.4	770.6	54.00	Average	Y
			point640	640	1,138.2	786.2	54.50	Average	Y
			point639	639	1,186.2	822.8	55.00	Average	Y
			point638	638	1,220.6	852.2	55.50	Average	Y
			point673	673	1,283.3	899.0	56.00	Average	Y
			point674	674	1,375.5	956.8	56.50	Average	Y
			point675	675	1,461.4	992.4	56.70	Average	Y
			point676	676	1,566.7	1,026.1	57.00		
SFOBB EB - 3	7.3		point656	656	851.5	461.6	50.00	Average	Y
			point655	655	895.9	512.1	51.50	Average	Y
			point654	654	935.9	554.4	53.00	Average	Y
			point653	653	1,008.2	637.6	53.50	Average	Y
			point652	652	1,080.5	720.3	53.70	Average	Y
			point651	651	1,124.2	765.5	54.00	Average	Y
			point650	650	1,142.5	780.7	54.50	Average	Y
			point649	649	1,190.6	817.3	55.00	Average	Y
			point648	648	1,224.9	846.7	55.50	Average	Y
			point677	677	1,287.5	893.4	56.00	Average	Y
			point678	678	1,379.6	949.5	56.50	Average	Y
			point679	679	1,465.1	986.0	56.70	Average	Y
			point680	680	1,568.8	1,019.6	57.00		
SFOBB WB ON NE	3.7		point704	704	932.7	650.5	49.00	Onramp	
			point703	703	923.0	654.9	50.00		Y
			point702	702	916.7	662.2	51.00		Y
			point701	701	914.1	674.4	52.00		Y
			point700	700	916.8	681.8	52.50		Y
			point699	699	920.5	687.6	53.00		Y

		point698	698	925.2	692.2	53.50	Average	Y
		point697	697	931.0	696.0	54.00	Average	Y
		point696	696	938.0	698.3	54.50	Average	Y
		point695	695	944.7	699.2	55.00	Average	Y
		point694	694	951.8	698.5	55.50	Average	Y
		point693	693	958.9	696.2	56.00	Average	Y
		point692	692	964.8	692.8	56.50	Average	Y
		point691	691	969.3	688.7	57.00	Average	Y
		point690	690	973.0	683.9	57.50	Average	Y
		point689	689	976.0	677.3	58.00	Average	Y
		point688	688	977.5	668.7	58.50	Average	Y
		point687	687	977.6	664.4	58.70	Average	Y
		point686	686	976.1	655.8	59.00	Average	Y
		point685	685	967.8	637.2	59.00	Average	Y
		point684	684	953.0	612.2	58.50	Average	Y
		point683	683	936.1	589.4	58.00	Average	Y
		point682	682	918.0	568.0	57.50	Average	Y
		point681	681	907.8	556.7	57.20		
SFOBB WB OFF NE	3.7	point723	723	1,149.9	850.5	59.00	Average	Y
		point722	722	1,115.9	820.6	59.50	Average	Y
		point721	721	1,083.8	789.7	60.00	Average	Y
		point720	720	1,057.2	761.3	60.00	Average	Y
		point719	719	1,033.9	735.0	59.50	Average	Y
		point718	718	1,021.0	723.4	59.00	Average	Y
		point717	717	1,004.0	712.9	58.50	Average	Y
		point716	716	987.7	708.4	58.00	Average	Y
		point715	715	973.9	708.5	57.50	Average	Y
		point714	714	961.5	711.2	57.00	Average	Y
		point713	713	948.8	713.5	56.50	Average	Y
		point712	712	937.3	712.4	56.00	Average	Y
		point711	711	927.1	709.1	55.50	Average	Y
		point710	710	918.2	703.9	55.00	Average	Y
		point709	709	911.6	698.0	54.50	Average	Y
		point708	708	906.8	691.6	54.00	Average	Y
		point707	707	903.1	684.5	53.50	Average	Y
		point706	706	898.2	673.6	53.00	Average	Y
		point705	705	894.0	662.4	52.70		
North Gate Rd - 2	3.7	point724	724	974.6	640.0	45.50	Average	
		point242	208	980.6	648.5	44.80	Average	



			point241	209	978.9	658.9	43.50		Average
			point240	210	974.3	664.4	43.00		Average
			point239	211	968.3	668.3	42.00		Average
			point238	212	946.7	679.7	40.50		Average
			point237	213	920.0	690.1	38.50		Average
			point236	214	903.8	696.0	38.00		Average
			point235	215	874.7	706.7	36.50		Average
			point234	216	856.7	711.6	35.50		Average
			point233	217	837.9	712.7	34.50		Average
			point232	218	808.2	706.6	33.00		Average
			point231	219	802.6	707.5	32.80		Average
			point230	220	798.2	714.0	32.50		Average
			point229	221	799.2	722.3	32.80		Average
			point228	222	808.3	725.7	31.50		Average
			point227	223	838.9	724.6	30.20		Average
			point226	224	869.2	727.4	28.20		Average
			point225	225	891.3	726.1	28.00		Average
			point224	226	899.9	736.4	26.70		Average
			point223	227	896.7	745.8	26.50		Average
			point222	228	887.6	757.5	26.00		Average
			point221	229	875.8	776.9	25.50		Average
			point220	230	873.5	791.2	23.50		Average
			point219	231	878.3	813.9	21.50		Average
			point218	232	887.7	828.1	20.00		Average
			point217	233	912.6	848.7	18.00		Average
			point216	234	931.5	858.7	16.50		Average
			point215	235	966.3	865.7	15.00		Average
			point214	236	1,029.0	871.4	10.50		Average
			point213	237	1,059.1	870.7	10.00		Average
			point212	238	1,075.1	869.6	9.50		Average
			point211	239	1,088.1	866.9	9.30		Average
			point210	240	1,092.6	863.7	9.30		Average
			point209	241	1,105.7	847.3	9.00		Average
			point208	242	1,132.0	810.7	8.70		Average
			point207	243	1,140.5	802.3	8.60		Average
			point206	244	1,171.5	789.1	7.00		Average
			point205	245	1,185.8	782.0	6.50		Average
			point204	246	1,191.4	775.4	6.00		Average
			point203	247	1,192.7	771.5	5.50		Average

		point202	248	1,193.2	765.2	5.00			Average
		point201	249	1,191.2	756.4	4.50			Average
		point200	250	1,177.4	740.0	4.00			Average
		point199	251	1,167.8	727.2	3.60			Average
		point198	252	1,158.1	712.1	3.50			Average
		point197	253	1,092.8	633.7	3.50			Average
		point196	254	1,080.9	616.6	4.00			Average
		point195	255	1,070.5	593.7	5.50			Average
		point194	256	1,067.2	577.5	5.70			Average
		point193	257	1,066.7	564.7	5.80			Average
		point192	258	1,070.5	554.0	5.60			Average
		point191	259	1,079.2	537.3	5.40			Average
		point190	260	1,096.3	488.5	4.50			Average
		point189	261	1,109.6	471.9	4.00			Average
		point188	262	1,122.5	464.6	3.50			
	3.7	point359	263	1,124.1	467.5	3.50			Average
		point358	264	1,111.4	473.9	4.00			Average
		point357	265	1,098.7	489.2	4.50			Average
		point356	266	1,089.0	516.7	5.00			Average
		point355	267	1,081.7	537.9	5.40			Average
		point354	268	1,073.4	555.5	5.60			Average
		point353	269	1,070.6	565.0	5.80			Average
		point352	270	1,070.8	576.7	5.70			Average
		point351	271	1,074.8	593.1	5.50			Average
		point350	272	1,085.1	615.7	4.00			Average
		point349	273	1,095.2	630.9	3.50			Average
		point348	274	1,107.1	644.5	3.50			Average
		point347	275	1,111.6	649.3	3.50			Average
		point346	276	1,128.6	669.7	3.50			Average
		point345	277	1,137.6	681.0	3.50			Average
		point344	278	1,163.4	712.1	3.50			Average
		point343	279	1,182.9	735.2	4.00			Average
		point342	280	1,190.3	745.6	4.20			Average
		point341	281	1,195.2	752.6	4.50			Average
		point340	282	1,198.5	763.6	5.00			Average
		point339	283	1,197.7	770.3	5.50			Average
		point338	284	1,195.7	776.6	6.00			Average
		point337	285	1,188.6	784.5	6.50			Average
		point335	287	1,172.5	792.6	7.00			Average

North Gate Rd - 1

**Yerba Buena Island 08080090.11**

C:\TNM\YB\NewSetBM0709\Alt 2B\A2080609\A2B081009



		point163	133	986.0	503.2	48.00			Average
		point162	134	984.4	452.2	53.50			Average
		point161	135	979.4	378.0	60.50			Average
		point160	136	975.4	356.4	61.50			Average
		point159	137	961.6	319.8	63.00			Average
		point158	138	950.8	306.7	63.50			Average
		point157	139	935.5	296.0	64.00			Average
		point156	140	921.7	290.2	64.00			Average
		point155	141	904.0	289.3	60.50			Average
		point154	142	896.6	291.0	60.80			Average
		point153	143	798.8	311.0	62.50			Average
		point152	144	776.7	316.4	62.20			Average
		point151	145	769.7	319.5	62.00			Average
		point150	146	728.3	352.1	71.50			Average
		point149	147	707.3	362.0	72.80			Average
		point148	148	694.4	363.4	74.00			Average
		point147	149	683.5	362.8	73.00			Average
		point146	150	671.9	360.6	72.50			Average
		point145	151	660.7	356.8	71.50			Average
		point144	152	654.9	355.4	70.00			Average
		point143	153	602.5	340.2	63.00			Average
		point142	154	591.8	337.9	62.00			Average
		point141	155	582.9	336.9	61.00			Average
		point140	156	571.6	337.4	60.00			Average
		point139	157	557.7	340.8	57.50			
Macalla Rd - 1	3.7	point754	754	970.6	644.2	45.50			Average
		point296	326	963.7	642.0	46.00			Average
		point295	327	954.1	643.0	47.50			Average
		point294	328	909.2	655.7	52.00			Average
		point293	329	863.1	668.1	56.50			Average
		point292	330	851.7	668.3	57.50			Average
		point291	331	838.7	666.6	58.50			Average
		point290	332	822.7	661.3	59.50			Average
		point289	333	790.9	647.9	65.00			Average
		point288	334	781.7	638.5	66.00			Average
		point287	335	776.7	627.2	66.20			Average
		point286	336	775.1	615.1	66.50			Average
		point285	337	763.7	595.8	67.50			Average
		point284	338	749.0	584.6	68.50			Average

## INPUT: ROADWAYS

Yerba Buena Island 08080090.11

			point283	339	730.6	577.1	69.50	Average
			point282	340	711.5	575.6	70.00	Average
			point281	341	688.8	580.4	70.50	Average
			point280	342	671.1	587.3	71.00	Average
			point279	343	658.3	586.9	70.60	Average
			point278	344	635.8	585.6	70.30	Average
			point277	345	618.9	584.9	70.00	Average
			point276	346	610.5	587.9	68.50	Average
			point275	347	590.6	604.4	67.50	
Treasure Is Rd - 1-2	3.7		point756	756	556.4	336.6	57.50	Average
			point185	161	571.0	332.7	60.00	Average
			point184	162	583.3	332.3	61.00	Average
			point183	163	594.8	332.7	62.00	Average
			point182	164	664.7	354.5	71.00	Average
			point181	165	676.6	357.9	72.50	Average
			point180	166	686.6	359.0	73.00	Average
			point179	167	694.3	359.5	74.00	Average
			point178	168	706.9	358.4	72.80	Average
			point177	169	726.5	348.7	71.50	Average
			point176	170	767.9	316.6	62.00	Average
			point175	171	776.8	312.8	62.20	Average
			point174	172	904.5	285.9	60.00	Average
			point173	173	924.4	287.5	64.00	Average
			point172	174	940.3	294.3	64.00	Average
			point171	175	956.4	306.2	63.50	Average
			point170	176	966.8	319.1	63.00	Average
			point169	177	975.3	338.1	61.00	Average
			point168	178	980.9	359.6	61.50	Average
			point167	179	983.1	378.2	60.50	Average
			point166	180	990.1	506.3	48.50	Average
			point165	181	988.9	518.9	48.00	
Roadway60	3.7		point664	758	589.2	601.8	67.50	Average
			point262	759	608.9	584.9	68.50	Average
			point261	760	619.0	581.8	70.00	Average
			point260	761	649.0	583.5	71.00	Average
			point259	762	671.1	584.4	71.00	Average
			point258	763	687.7	577.3	70.50	Average
			point257	764	711.7	572.7	70.00	Average
			point256	765	731.9	574.3	69.50	Average

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11

13.

INPUT: ROADWAYS

Yerba Buena Island 08080090.11

		point255	766	750.7	582.4	68.50			Average	
		point254	767	765.5	593.8	67.50			Average	
		point253	768	778.2	614.7	66.50			Average	
		point252	769	780.7	627.7	66.20			Average	
		point251	770	784.5	637.3	66.00			Average	
		point250	771	792.7	645.2	65.00			Average	
		point249	772	824.3	658.8	58.50			Average	
		point248	773	840.9	664.0	58.50			Average	
		point247	774	852.9	665.3	57.50			Average	
		point246	775	862.9	665.1	56.50			Average	
		point245	776	953.4	637.5	47.50			Average	
		point244	777	965.0	636.8	46.50			Average	
		point243	778	974.6	640.0	45.50			Average	



EDAW/AECOM  
Maddux, B.

13 August 2009  
TNM 2.5

INPUT: TRAFFIC FOR LAeq1h Volumes

PROJECT/CONTRACT:

Yerba Buena Island 08080090.11

RUN:

Future Alternative 2B

Roadway		Points		No.	Segment		Autos		MTrucks		HTrucks		Buses		Motorcycles	
Name			Name		V	S	V	S	V	S	V	S	V	S	V	S
					veh/hr	km/h	veh/hr	km/h	veh/hr	km/h	veh/hr	km/h	veh/hr	km/h	veh/hr	km/h
SFOBB WB OFF SE			point82	70	314	88	4	88	5	88	0	0	0	0	0	0
			point81	71	314	88	4	88	5	88	0	0	0	0	0	0
			point80	72	314	88	4	88	5	88	0	0	0	0	0	0
			point79	73	314	88	4	88	5	88	0	0	0	0	0	0
			point78	74	314	88	4	88	5	88	0	0	0	0	0	0
			point77	75	314	88	4	88	5	88	0	0	0	0	0	0
			point76	76	314	88	4	88	5	88	0	0	0	0	0	0
			point75	77	314	88	4	88	5	88	0	0	0	0	0	0
			point74	78	314	88	4	88	5	88	0	0	0	0	0	0
			point73	79												
SFOBB EB OFF SE			point96	80	248	88	3	88	4	88	0	0	0	0	0	0
			point95	81	248	88	3	88	4	88	0	0	0	0	0	0
			point94	82	248	88	3	88	4	88	0	0	0	0	0	0
			point93	83	248	88	3	88	4	88	0	0	0	0	0	0
			point92	84	248	88	3	88	4	88	0	0	0	0	0	0
			point91	85	248	88	3	88	4	88	0	0	0	0	0	0
			point90	86	248	88	3	88	4	88	0	0	0	0	0	0
			point89	87	248	88	3	88	4	88	0	0	0	0	0	0
			point88	88	248	88	3	88	4	88	0	0	0	0	0	0
			point87	89	248	88	3	88	4	88	0	0	0	0	0	0
			point86	90	248	88	3	88	4	88	0	0	0	0	0	0
			point85	91	248	88	3	88	4	88	0	0	0	0	0	0
			point84	92	248	88	3	88	4	88	0	0	0	0	0	0







	point619	619	3075	105	41	105	51	88	0	0	0
	point618	618	3075	105	41	105	51	88	0	0	0
	point617	617	3075	105	41	105	51	88	0	0	0
	point616	616	3075	105	41	105	51	88	0	0	0
	point615	615	3075	105	41	105	51	88	0	0	0
	point614	614	3075	105	41	105	51	88	0	0	0
	point613	613									
SFOBB WB - 2	point664	664	3075	105	41	105	51	88	0	0	0
	point663	663	3075	105	41	105	51	88	0	0	0
	point662	662	3075	105	41	105	51	88	0	0	0
	point612	612	3075	105	41	105	51	88	0	0	0
	point611	611	3075	105	41	105	51	88	0	0	0
	point610	610	3075	105	41	105	51	88	0	0	0
	point609	609	3075	105	41	105	51	88	0	0	0
	point608	608	3075	105	41	105	51	88	0	0	0
	point607	607	3075	105	41	105	51	88	0	0	0
	point606	606	3075	105	41	105	51	88	0	0	0
	point605	605	3075	105	41	105	51	88	0	0	0
	point604	604	3075	105	41	105	51	88	0	0	0
	point603	603	3075	105	41	105	51	88	0	0	0
	point602	602	3075	105	41	105	51	88	0	0	0
	point601	601	3075	105	41	105	51	88	0	0	0
	point600	600	3075	105	41	105	51	88	0	0	0
	point599	599									
SFOBB WB - 1	point660	660	3075	105	41	105	51	88	0	0	0
	point659	659	3075	105	41	105	51	88	0	0	0
	point658	658	3075	105	41	105	51	88	0	0	0
	point596	596	3075	105	41	105	51	88	0	0	0
	point595	595	3075	105	41	105	51	88	0	0	0
	point594	594	3075	105	41	105	51	88	0	0	0
	point593	593	3075	105	41	105	51	88	0	0	0
	point592	592	3075	105	41	105	51	88	0	0	0
	point591	591	3075	105	41	105	51	88	0	0	0
	point590	590	3075	105	41	105	51	88	0	0	0
	point589	589	3075	105	41	105	51	88	0	0	0
	point588	588	3075	105	41	105	51	88	0	0	0

	point587	587	3075	105	41	105	51	88	0	0	0	0
	point586	586	3075	105	41	105	51	88	0	0	0	0
	point585	585	3075	105	41	105	51	88	0	0	0	0
	point584	584	3075	105	41	105	51	88	0	0	0	0
	point583	583										
SFOBB EB - 1	point636	636	2754	105	37	105	45	88	0	0	0	0
	point635	635	2754	105	37	105	45	88	0	0	0	0
	point634	634	2754	105	37	105	45	88	0	0	0	0
	point633	633	2754	105	37	105	45	88	0	0	0	0
	point632	632	2754	105	37	105	45	88	0	0	0	0
	point631	631	2754	105	37	105	45	88	0	0	0	0
	point630	630	2754	105	37	105	45	88	0	0	0	0
	point629	629	2754	105	37	105	45	88	0	0	0	0
	point628	628	2754	105	37	105	45	88	0	0	0	0
	point669	669	2754	105	37	105	45	88	0	0	0	0
	point670	670	2754	105	37	105	45	88	0	0	0	0
	point671	671	2754	105	37	105	45	88	0	0	0	0
	point672	672										
SFOBB EB - 2	point646	646	2754	105	37	105	45	88	0	0	0	0
	point645	645	2754	105	37	105	45	88	0	0	0	0
	point644	644	2754	105	37	105	45	88	0	0	0	0
	point643	643	2754	105	37	105	45	88	0	0	0	0
	point642	642	2754	105	37	105	45	88	0	0	0	0
	point641	641	2754	105	37	105	45	88	0	0	0	0
	point640	640	2754	105	37	105	45	88	0	0	0	0
	point639	639	2754	105	37	105	45	88	0	0	0	0
	point638	638	2754	105	37	105	45	88	0	0	0	0
	point673	673	2754	105	37	105	45	88	0	0	0	0
	point674	674	2754	105	37	105	45	88	0	0	0	0
	point675	675	2754	105	37	105	45	88	0	0	0	0
	point676	676										
SFOBB EB - 3	point656	656	2754	105	37	105	45	88	0	0	0	0
	point655	655	2754	105	37	105	45	88	0	0	0	0
	point654	654	2754	105	37	105	45	88	0	0	0	0
	point653	653	2754	105	37	105	45	88	0	0	0	0
	point652	652	2754	105	37	105	45	88	0	0	0	0

point651	651	2754	105	37	105	45	88	0	0	0
point650	650	2754	105	37	105	45	88	0	0	0
point649	649	2754	105	37	105	45	88	0	0	0
point648	648	2754	105	37	105	45	88	0	0	0
point677	677	2754	105	37	105	45	88	0	0	0
point678	678	2754	105	37	105	45	88	0	0	0
point679	679	2754	105	37	105	45	88	0	0	0
point680	680									
SFOBB WB ON NE	point704	848	88	11	88	14	88	0	0	0
	point703	848	88	11	88	14	88	0	0	0
	point702	848	88	11	88	14	88	0	0	0
	point701	848	88	11	88	14	88	0	0	0
	point700	848	88	11	88	14	88	0	0	0
	point699	848	88	11	88	14	88	0	0	0
	point698	848	88	11	88	14	88	0	0	0
	point697	848	88	11	88	14	88	0	0	0
	point696	848	88	11	88	14	88	0	0	0
	point695	848	88	11	88	14	88	0	0	0
	point694	848	88	11	88	14	88	0	0	0
	point693	848	88	11	88	14	88	0	0	0
	point692	848	88	11	88	14	88	0	0	0
	point691	848	88	11	88	14	88	0	0	0
	point690	848	88	11	88	14	88	0	0	0
	point689	848	88	11	88	14	88	0	0	0
	point688	848	88	11	88	14	88	0	0	0
	point687	848	88	11	88	14	88	0	0	0
	point686	848	88	11	88	14	88	0	0	0
	point685	848	88	11	88	14	88	0	0	0
	point684	848	88	11	88	14	88	0	0	0
	point683	848	88	11	88	14	88	0	0	0
	point682	848	88	11	88	14	88	0	0	0
	point681									
SFOBB WB OFF NE	point723	314	88	4	88	5	88	0	0	0
	point722	314	88	4	88	5	88	0	0	0
	point721	314	88	4	88	5	88	0	0	0
	point720	314	88	4	88	5	88	0	0	0



	point719	719	314	88	4	88	5	88	0	0	0	0
	point718	718	314	88	4	88	5	88	0	0	0	0
	point717	717	314	88	4	88	5	88	0	0	0	0
	point716	716	314	88	4	88	5	88	0	0	0	0
	point715	715	314	88	4	88	5	88	0	0	0	0
	point714	714	314	88	4	88	5	88	0	0	0	0
	point713	713	314	88	4	88	5	88	0	0	0	0
	point712	712	314	88	4	88	5	88	0	0	0	0
	point711	711	314	88	4	88	5	88	0	0	0	0
	point710	710	314	88	4	88	5	88	0	0	0	0
	point709	709	314	88	4	88	5	88	0	0	0	0
	point708	708	314	88	4	88	5	88	0	0	0	0
	point707	707	314	88	4	88	5	88	0	0	0	0
	point706	706	314	88	4	88	5	88	0	0	0	0
	point705	705										
North Gate Rd - 2	point724	724	340	40	7	40	3	40	0	0	0	0
	point242	208	340	40	7	40	3	40	0	0	0	0
	point241	209	340	40	7	40	3	40	0	0	0	0
	point240	210	340	40	7	40	3	40	0	0	0	0
	point239	211	340	40	7	40	3	40	0	0	0	0
	point238	212	340	40	7	40	3	40	0	0	0	0
	point237	213	340	40	7	40	3	40	0	0	0	0
	point236	214	340	40	7	40	3	40	0	0	0	0
	point235	215	340	40	7	40	3	40	0	0	0	0
	point234	216	340	40	7	40	3	40	0	0	0	0
	point233	217	340	40	7	40	3	40	0	0	0	0
	point232	218	340	40	7	40	3	40	0	0	0	0
	point231	219	340	40	7	40	3	40	0	0	0	0
	point230	220	340	40	7	40	3	40	0	0	0	0
	point229	221	340	40	7	40	3	40	0	0	0	0
	point228	222	340	40	7	40	3	40	0	0	0	0
	point227	223	340	40	7	40	3	40	0	0	0	0
	point226	224	340	40	7	40	3	40	0	0	0	0
	point225	225	340	40	7	40	3	40	0	0	0	0
	point224	226	340	40	7	40	3	40	0	0	0	0
	point223	227	340	40	7	40	3	40	0	0	0	0

point222	228	340	40	7	40	3	40	0	0	0
point221	229	340	40	7	40	3	40	0	0	0
point220	230	340	40	7	40	3	40	0	0	0
point219	231	340	40	7	40	3	40	0	0	0
point218	232	340	40	7	40	3	40	0	0	0
point217	233	340	40	7	40	3	40	0	0	0
point216	234	340	40	7	40	3	40	0	0	0
point215	235	340	40	7	40	3	40	0	0	0
point214	236	340	40	7	40	3	40	0	0	0
point213	237	340	40	7	40	3	40	0	0	0
point212	238	340	40	7	40	3	40	0	0	0
point211	239	340	40	7	40	3	40	0	0	0
point210	240	340	40	7	40	3	40	0	0	0
point209	241	340	40	7	40	3	40	0	0	0
point208	242	340	40	7	40	3	40	0	0	0
point207	243	340	40	7	40	3	40	0	0	0
point206	244	340	40	7	40	3	40	0	0	0
point205	245	340	40	7	40	3	40	0	0	0
point204	246	340	40	7	40	3	40	0	0	0
point203	247	340	40	7	40	3	40	0	0	0
point202	248	340	40	7	40	3	40	0	0	0
point201	249	340	40	7	40	3	40	0	0	0
point200	250	340	40	7	40	3	40	0	0	0
point199	251	340	40	7	40	3	40	0	0	0
point198	252	340	40	7	40	3	40	0	0	0
point197	253	340	40	7	40	3	40	0	0	0
point196	254	340	40	7	40	3	40	0	0	0
point195	255	340	40	7	40	3	40	0	0	0
point194	256	340	40	7	40	3	40	0	0	0
point193	257	340	40	7	40	3	40	0	0	0
point192	258	340	40	7	40	3	40	0	0	0
point191	259	340	40	7	40	3	40	0	0	0
point190	260	340	40	7	40	3	40	0	0	0
point189	261	340	40	7	40	3	40	0	0	0
point188	262									
North Gate Rd - 1	263	340	40	7	40	3	40	0	0	0

point358	264	340	40	7	40	3	40	0	0	0
point357	265	340	40	7	40	3	40	0	0	0
point356	266	340	40	7	40	3	40	0	0	0
point355	267	340	40	7	40	3	40	0	0	0
point354	268	340	40	7	40	3	40	0	0	0
point353	269	340	40	7	40	3	40	0	0	0
point352	270	340	40	7	40	3	40	0	0	0
point351	271	340	40	7	40	3	40	0	0	0
point350	272	340	40	7	40	3	40	0	0	0
point349	273	340	40	7	40	3	40	0	0	0
point348	274	340	40	7	40	3	40	0	0	0
point347	275	340	40	7	40	3	40	0	0	0
point346	276	340	40	7	40	3	40	0	0	0
point345	277	340	40	7	40	3	40	0	0	0
point344	278	340	40	7	40	3	40	0	0	0
point343	279	340	40	7	40	3	40	0	0	0
point342	280	340	40	7	40	3	40	0	0	0
point341	281	340	40	7	40	3	40	0	0	0
point340	282	340	40	7	40	3	40	0	0	0
point339	283	340	40	7	40	3	40	0	0	0
point338	284	340	40	7	40	3	40	0	0	0
point337	285	340	40	7	40	3	40	0	0	0
point335	287	340	40	7	40	3	40	0	0	0
point334	288	340	40	7	40	3	40	0	0	0
point333	289	340	40	7	40	3	40	0	0	0
point332	290	340	40	7	40	3	40	0	0	0
point331	291	340	40	7	40	3	40	0	0	0
point330	292	340	40	7	40	3	40	0	0	0
point329	293	340	40	7	40	3	40	0	0	0
point328	294	340	40	7	40	3	40	0	0	0
point327	295	340	40	7	40	3	40	0	0	0
point326	296	340	40	7	40	3	40	0	0	0
point325	297	340	40	7	40	3	40	0	0	0
point324	298	340	40	7	40	3	40	0	0	0
point323	299	340	40	7	40	3	40	0	0	0
point322	300	340	40	7	40	3	40	0	0	0



point321	301	340	40	7	40	3	40	0	0	0
point320	302	340	40	7	40	3	40	0	0	0
point319	303	340	40	7	40	3	40	0	0	0
point318	304	340	40	7	40	3	40	0	0	0
point317	305	340	40	7	40	3	40	0	0	0
point316	306	340	40	7	40	3	40	0	0	0
point315	307	340	40	7	40	3	40	0	0	0
point314	308	340	40	7	40	3	40	0	0	0
point313	309	340	40	7	40	3	40	0	0	0
point312	310	340	40	7	40	3	40	0	0	0
point311	311	340	40	7	40	3	40	0	0	0
point310	312	340	40	7	40	3	40	0	0	0
point309	313	340	40	7	40	3	40	0	0	0
point308	314	340	40	7	40	3	40	0	0	0
point307	315	340	40	7	40	3	40	0	0	0
point306	316	340	40	7	40	3	40	0	0	0
point305	317	340	40	7	40	3	40	0	0	0
point304	318	340	40	7	40	3	40	0	0	0
point303	319	340	40	7	40	3	40	0	0	0
point302	320	340	40	7	40	3	40	0	0	0
point301	321	340	40	7	40	3	40	0	0	0
point300	322	340	40	7	40	3	40	0	0	0
point299	323	340	40	7	40	3	40	0	0	0
point298	324	340	40	7	40	3	40	0	0	0
point297	325									
Treasure Is Rd - 2	point164	132	340	65	7	65	3	65	0	0
	point163	133	340	65	7	65	3	65	0	0
	point162	134	340	65	7	65	3	65	0	0
	point161	135	340	65	7	65	3	65	0	0
	point160	136	340	65	7	65	3	65	0	0
	point159	137	340	65	7	65	3	65	0	0
	point158	138	340	65	7	65	3	65	0	0
	point157	139	340	65	7	65	3	65	0	0
	point156	140	340	65	7	65	3	65	0	0
	point155	141	340	65	7	65	3	65	0	0
	point154	142	340	65	7	65	3	65	0	0

	point153	143	340	65	7	65	3	65	0	0	0
	point152	144	340	65	7	65	3	65	0	0	0
	point151	145	340	65	7	65	3	65	0	0	0
	point150	146	340	65	7	65	3	65	0	0	0
	point149	147	340	65	7	65	3	65	0	0	0
	point148	148	340	65	7	65	3	65	0	0	0
	point147	149	340	65	7	65	3	65	0	0	0
	point146	150	340	65	7	65	3	65	0	0	0
	point145	151	340	65	7	65	3	65	0	0	0
	point144	152	340	65	7	65	3	65	0	0	0
	point143	153	340	65	7	65	3	65	0	0	0
	point142	154	340	65	7	65	3	65	0	0	0
	point141	155	340	65	7	65	3	65	0	0	0
	point140	156	340	65	7	65	3	65	0	0	0
	point139	157									
Macalla Rd - 1	point754	754	340	40	7	40	3	40	0	0	0
	point296	326	340	40	7	40	3	40	0	0	0
	point295	327	340	40	7	40	3	40	0	0	0
	point294	328	340	40	7	40	3	40	0	0	0
	point293	329	340	40	7	40	3	40	0	0	0
	point292	330	340	40	7	40	3	40	0	0	0
	point291	331	340	40	7	40	3	40	0	0	0
	point290	332	340	40	7	40	3	40	0	0	0
	point289	333	340	40	7	40	3	40	0	0	0
	point288	334	340	40	7	40	3	40	0	0	0
	point287	335	340	40	7	40	3	40	0	0	0
	point286	336	340	40	7	40	3	40	0	0	0
	point285	337	340	40	7	40	3	40	0	0	0
	point284	338	340	40	7	40	3	40	0	0	0
	point283	339	340	40	7	40	3	40	0	0	0
	point282	340	340	40	7	40	3	40	0	0	0
	point281	341	340	40	7	40	3	40	0	0	0
	point280	342	340	40	7	40	3	40	0	0	0
	point279	343	340	40	7	40	3	40	0	0	0
	point278	344	340	40	7	40	3	40	0	0	0
	point277	345	340	40	7	40	3	40	0	0	0

	point276	346	340	40	7	40	3	40	0	0	0	0
	point275	347										
Treasure Is Rd - 1-2	point756	756	340	65	7	65	3	65	0	0	0	0
	point185	161	340	65	7	65	3	65	0	0	0	0
	point184	162	340	65	7	65	3	65	0	0	0	0
	point183	163	340	65	7	65	3	65	0	0	0	0
	point182	164	340	65	7	65	3	65	0	0	0	0
	point181	165	340	65	7	65	3	65	0	0	0	0
	point180	166	340	65	7	65	3	65	0	0	0	0
	point179	167	340	65	7	65	3	65	0	0	0	0
	point178	168	340	65	7	65	3	65	0	0	0	0
	point177	169	340	65	7	65	3	65	0	0	0	0
	point176	170	340	65	7	65	3	65	0	0	0	0
	point175	171	340	65	7	65	3	65	0	0	0	0
	point174	172	340	65	7	65	3	65	0	0	0	0
	point173	173	340	65	7	65	3	65	0	0	0	0
	point172	174	340	65	7	65	3	65	0	0	0	0
	point171	175	340	65	7	65	3	65	0	0	0	0
	point170	176	340	65	7	65	3	65	0	0	0	0
	point169	177	340	65	7	65	3	65	0	0	0	0
	point168	178	340	65	7	65	3	65	0	0	0	0
	point167	179	340	65	7	65	3	65	0	0	0	0
	point166	180	340	65	7	65	3	65	0	0	0	0
	point165	181										
Roadway60	point664	758	340	40	7	40	3	40	0	0	0	0
	point262	759	340	40	7	40	3	40	0	0	0	0
	point261	760	340	40	7	40	3	40	0	0	0	0
	point260	761	340	40	7	40	3	40	0	0	0	0
	point259	762	340	40	7	40	3	40	0	0	0	0
	point258	763	340	40	7	40	3	40	0	0	0	0
	point257	764	340	40	7	40	3	40	0	0	0	0
	point256	765	340	40	7	40	3	40	0	0	0	0
	point255	766	340	40	7	40	3	40	0	0	0	0
	point254	767	340	40	7	40	3	40	0	0	0	0
	point253	768	340	40	7	40	3	40	0	0	0	0
	point252	769	340	40	7	40	3	40	0	0	0	0



INPUT: TRAFFIC FOR LAeq1h Volumes

Yerba Buena Island 08080090.11

point251	770	340	40	7	40	3	40	0	0	0	0
point250	771	340	40	7	40	3	40	0	0	0	0
point249	772	340	40	7	40	3	40	0	0	0	0
point248	773	340	40	7	40	3	40	0	0	0	0
point247	774	340	40	7	40	3	40	0	0	0	0
point246	775	340	40	7	40	3	40	0	0	0	0
point245	776	340	40	7	40	3	40	0	0	0	0
point244	777	340	40	7	40	3	40	0	0	0	0
point243	778										

## INPUT: RECEIVERS

Yerba Buena Island 08080090.11

EDAW/AECOM  
Maddux, B.20 October 2009  
TNM 2.5

## INPUT: RECEIVERS

## PROJECT/CONTRACT:

Yerba Buena Island 08080090.11

## RUN:

Future Alternative 2B

Receiver												
Name	No.	#DUs	Coordinates (ground)			Z	Height above Ground	Input Sound Levels and Criteria				Active in Calc.
			X	Y				Existing LAeq1h	Impact Criteria		NR Goal	
									LAeq1h	Sub'l		
			m	m		m	m	dBA	dBA	dB	dB	
R-1	9	1	916.0	782.7	28.00	1.50	0.00	71	12.0	5.0		
R-2 (ST-1)	16	1	989.0	755.0	21.00	1.50	0.00	71	12.0	5.0		
R-3	17	1	855.5	618.7	64.00	1.50	0.00	66	12.0	5.0		
R-4 (ST-3)	18	1	1,163.1	658.2	2.80	1.50	0.00	71	12.0	5.0		
R-5	19	1	1,125.6	585.5	2.80	1.50	0.00	71	12.0	5.0		
R-6	20	1	1,132.2	636.9	2.70	1.50	0.00	66	12.0	5.0		
R-7	21	1	1,103.1	625.7	2.80	1.50	0.00	66	12.0	5.0		
R-8	22	1	1,095.9	589.2	2.80	1.50	0.00	66	12.0	5.0		
R-9	24	1	1,104.5	546.9	3.10	1.50	0.00	66	12.0	5.0		
R-10 (ST-2)	25	1	1,111.1	505.2	3.70	1.50	0.00	72	12.0	5.0		
R-11	38	1	1,020.4	431.5	46.00	1.50	0.00	66	12.0	5.0		
R-12 (ST-4)	39	1	1,022.0	456.0	45.00	1.50	0.00	66	12.0	5.0		
R-13 (ST-5)	40	1	1,021.2	379.7	45.00	1.50	0.00	66	12.0	5.0		
R-14	41	1	1,018.4	397.2	51.80	1.50	0.00	66	12.0	5.0	Y	
R-15	42	1	1,020.0	357.1	52.20	1.50	0.00	66	12.0	5.0	Y	
R-16	43	1	794.8	434.3	101.50	1.50	0.00	71	12.0	5.0		
R-17	54	1	719.3	596.8	66.70	1.50	0.00	71	12.0	5.0		
R-1 0												
R-2 (ST-1) 0												
R-3 0												
R-4 (ST-3) 0												
R-5 0												

**Yerba Buena Island 08080090.11**

R-6	0
R-7	0
R-8	0
R-9	0
R-10 (ST-2)	0
R-11	1
R-12 (ST-4)	0
R-13 (ST-5)	0
R-14	0
R-15	0
R-16	0



EDAW/AECOM  
Maddux, B.  
13 August 2009  
TNM 2.5

## INPUT: BARRIERS

PROJECT/CONTRACT: Yerba Buena Island 08080090.11

RUN: Future Alternative 2B

Barrier Name	Type	Height		Max	If Wall \$ per Unit Area	If Berm \$ per Unit Vol.	Top Width	Run: Rise	Add'l \$ per Unit Length	Points			Coordinates (bottom)			Height at Point		Segment		Important Reflec-tions?
		Min	m	m			m	m:m		Name	No.		X	Y	Z	m	m	Incr- #Up	On #Dn	
Barrier1	W	0.00	30.48	0.00					0.00	point1	1		814.3	417.7	100.50	4.50	0.00	0	0	
										point2	2		820.7	399.2	100.50	4.50	0.00	0	0	
										point3	3		817.8	398.3	100.50	4.50	0.00	0	0	
										point4	4		819.5	393.0	100.50	4.50	0.00	0	0	
										point5	5		828.7	396.0	100.50	4.50	0.00	0	0	
										point6	6		827.9	398.5	100.50	4.50	0.00	0	0	
										point7	7		834.2	400.4	100.50	4.50	0.00	0	0	
										point8	8		834.4	399.5	100.50	4.50	0.00	0	0	
										point9	9		838.3	400.8	100.50	4.50	0.00	0	0	
										point10	10		837.2	404.2	100.50	4.50	0.00	0	0	
										point11	11		839.7	405.0	100.50	4.50	0.00	0	0	
										point12	12		834.5	421.0	100.50	4.50	0.00	0	0	
										point13	13		823.0	417.3	100.50	4.50	0.00	0	0	
										point14	14		821.9	420.4	100.50	4.50	0.00	0	0	
										point15	15		814.3	417.7	100.50	4.50				
Barrier2	W	0.00	30.48	0.00					0.00	point16	16		723.3	398.9	92.00	6.00	0.00	0	0	
										point17	17		717.0	401.9	92.00	6.00	0.00	0	0	
										point18	18		717.7	403.4	92.00	6.00	0.00	0	0	
										point19	19		708.9	407.5	92.00	6.00	0.00	0	0	
										point20	20		708.3	406.0	92.00	6.00	0.00	0	0	
										point21	21		701.9	409.0	92.00	6.00	0.00	0	0	
										point22	22		705.7	417.0	92.00	6.00	0.00	0	0	
										point23	23		707.2	416.2	92.00	6.00	0.00	0	0	
										point24	24		708.0	418.0	92.00	6.00	0.00	0	0	
										point25	25		726.3	409.4	92.00	6.00	0.00	0	0	
										point26	26		725.5	407.6	92.00	6.00	0.00	0	0	
										point27	27		727.0	406.9	92.00	6.00	0.00	0	0	
										point28	28		723.3	398.9	92.00	6.00				
Barrier3	W	0.00	30.48	0.00					0.00	point29	29		680.1	423.5	92.00	6.00	0.00	0	0	
										point30	30		685.8	419.6	92.00	6.00	0.00	0	0	
										point31	31		686.7	420.8	92.00	6.00	0.00	0	0	
										point32	32		694.7	415.3	92.00	6.00	0.00	0	0	
										point33	33		693.9	414.1	92.00	6.00	0.00	0	0	
										point34	34		699.6	410.5	92.00	6.00	0.00	0	0	
										point35	35		704.4	417.4	92.00	6.00	0.00	0	0	

										point36	36	703.0	418.2	92.00	6.00	0.00	0	0
										point37	37	704.2	419.9	92.00	6.00	0.00	0	0
										point38	38	687.4	431.4	92.00	6.00	0.00	0	0
										point39	39	686.3	429.8	92.00	6.00	0.00	0	0
										point40	40	685.0	430.7	92.00	6.00	0.00	0	0
										point41	41	680.1	423.5	92.00	6.00			
Barrier4		W	0.00	30.48	0.00				0.00	point42	42	662.2	446.1	92.00	6.00	0.00	0	0
										point43	43	666.2	440.5	92.00	6.00	0.00	0	0
										point44	44	667.5	441.4	92.00	6.00	0.00	0	0
										point45	45	673.2	433.5	92.00	6.00	0.00	0	0
										point46	46	672.0	432.6	92.00	6.00	0.00	0	0
										point47	47	676.1	427.3	92.00	6.00	0.00	0	0
										point48	48	683.0	432.2	92.00	6.00	0.00	0	0
										point49	49	682.0	433.4	92.00	6.00	0.00	0	0
										point50	50	683.6	434.6	92.00	6.00	0.00	0	0
										point51	51	671.7	451.1	92.00	6.00	0.00	0	0
										point52	52	670.2	449.9	92.00	6.00	0.00	0	0
										point53	53	669.3	451.2	92.00	6.00	0.00	0	0
										point54	54	662.2	446.1	92.00	6.00			
Barrier5		W	0.00	30.48	0.00			0.00		point55	55	621.3	443.4	86.00	6.00	0.00	0	0
										point56	56	629.0	439.2	86.00	6.00	0.00	0	0
										point57	57	628.4	438.0	86.00	6.00	0.00	0	0
										point58	58	632.9	435.5	86.00	6.00	0.00	0	0
										point59	59	633.8	437.2	86.00	6.00	0.00	0	0
										point60	60	641.4	433.0	86.00	6.00	0.00	0	0
										point61	61	644.4	438.4	86.00	6.00	0.00	0	0
										point62	62	642.8	439.3	86.00	6.00	0.00	0	0
										point63	63	644.5	442.4	86.00	6.00	0.00	0	0
										point64	64	639.2	445.2	86.00	6.00	0.00	0	0
										point65	65	639.7	446.1	86.00	6.00	0.00	0	0
										point66	66	633.5	449.5	86.00	6.00	0.00	0	0
										point67	67	632.8	448.2	86.00	6.00	0.00	0	0
										point68	68	627.3	451.2	86.00	6.00	0.00	0	0
										point69	69	625.5	448.0	86.00	6.00	0.00	0	0
										point70	70	624.1	448.7	86.00	6.00	0.00	0	0
										point71	71	621.3	443.4	86.00	6.00			
Barrier6		W	0.00	30.48	0.00			0.00		point72	72	645.1	431.4	86.00	6.00	0.00	0	0
										point73	73	650.5	424.6	86.00	6.00	0.00	0	0
										point74	74	649.2	423.6	86.00	6.00	0.00	0	0
										point75	75	652.4	419.6	86.00	6.00	0.00	0	0
										point76	76	653.6	420.6	86.00	6.00	0.00	0	0
										point77	77	659.0	413.7	86.00	6.00	0.00	0	0
										point78	78	663.7	417.4	86.00	6.00	0.00	0	0
										point79	79	662.8	418.6	86.00	6.00	0.00	0	0
										point80	80	665.5	420.8	86.00	6.00	0.00	0	0
										point81	81	661.8	425.5	86.00	6.00	0.00	0	0
										point82	82	663.0	426.4	86.00	6.00	0.00	0	0
										point83	83	658.5	432.1	86.00	6.00	0.00	0	0
										point84	84	658.0	431.7	86.00	6.00	0.00	0	0

[illegible]























INPUT: TERRAIN LINES

EDAW/AECOM

Maddux, B.

13 August 2009

TNM 2.5

INPUT: TERRAIN LINES

PROJECT/CONTRACT:

Yerba Buena Island 08080090.11

RUN:

Future Alternative 2B

Terrain Line Name	Points			
	No.	Coordinates (ground)		
		X	Y	Z
		m	m	m
Terrain Line7	65	711.3	722.8	0.50
	66	708.4	693.7	10.00
	67	702.2	671.8	20.00
	68	697.4	656.0	30.00
	69	697.0	643.4	40.00
	70	698.4	633.3	50.00
	71	701.3	623.5	60.00
Terrain Line8	72	701.6	614.8	66.50
	73	693.8	610.9	67.00
	74	775.9	636.9	66.00
	75	776.0	652.2	60.00
	76	760.7	664.5	50.00
	77	749.2	666.9	40.00
	78	745.1	679.7	32.00
Terrain Line9	79	741.0	692.2	20.00
	80	736.4	708.9	10.00
	81	728.9	726.6	0.50
Terrain Line10	82	793.5	779.6	0.50
	83	804.9	734.8	30.00
	84	891.8	737.7	26.50
	85	880.2	742.8	25.00
	86	857.1	753.1	24.00
	87	849.0	763.4	14.00
	88	835.4	783.9	4.00

INPUT: TERRAIN LINES

	89	835.0	795.2	0.50
Terrain Line11	90	855.1	809.6	0.50
	91	871.4	775.5	24.50
Terrain Line12	92	860.0	843.5	0.50
	93	880.1	821.7	20.00
Terrain Line13	94	882.2	862.6	0.50
	95	902.1	845.4	18.00
Terrain Line14	96	919.8	882.0	0.50
	97	927.1	861.2	16.00
Terrain Line15	98	940.8	864.0	16.00
	99	946.0	867.4	14.00
	100	949.1	881.7	8.00
	101	945.2	890.5	4.00
	102	937.9	894.6	0.50
Terrain Line16	103	968.5	886.1	0.50
	104	962.0	868.2	15.00
Terrain Line17	105	1,029.6	900.0	0.50
	106	1,031.9	878.5	12.00
Terrain Line19	109	927.7	853.3	18.00
	110	926.5	838.9	24.00
	111	926.7	832.6	25.50
Terrain Line20	112	959.6	860.0	15.50
	113	949.0	832.9	24.50
Terrain Line21	114	886.1	821.0	22.00
	115	888.6	814.3	24.00
	116	891.7	812.4	25.00
	117	898.1	806.1	26.00
Terrain Line22	118	880.7	778.3	26.00
	119	888.4	777.8	26.50
	120	889.8	777.7	27.50
	121	899.3	778.8	28.00
	122	912.4	784.1	29.00
Terrain Line23	123	900.8	756.4	26.00
	124	903.3	772.2	28.00
	125	913.2	783.0	29.00
Terrain Line24	126	915.3	796.2	26.00



INPUT: TERRAIN LINES

Yerba Buena Island 08080090.11

		127	909.5	798.3	26.50
Terrain Line25		128	923.4	816.5	25.50
		129	923.6	813.4	27.00
		130	920.9	806.0	28.50
Terrain Line26		131	942.4	802.0	23.50
		132	935.6	803.3	26.50
		133	924.8	803.3	29.00
Terrain Line27		134	956.2	754.4	22.50
		135	948.0	764.3	23.50
		136	920.0	791.6	28.50
Terrain Line28		137	948.3	789.6	22.50
		138	942.9	787.8	26.00
Terrain Line29		139	954.5	822.7	24.50
		140	968.2	849.7	18.00
		141	985.8	861.3	13.50
		142	999.7	860.6	12.00
		143	1,026.4	859.3	11.00
		144	1,055.7	857.9	10.00
		145	1,071.0	858.7	9.50
Terrain Line31		146	1,027.1	836.6	11.50
		147	1,027.0	825.3	12.30
		148	1,025.8	810.2	11.50
Terrain Line32		149	1,054.2	841.3	11.50
		150	1,048.9	825.2	14.50
		151	1,050.8	811.9	12.00
		152	1,057.4	801.8	13.50
		153	1,063.4	797.9	11.50
Terrain Line33		155	956.4	742.7	21.50
		156	990.1	750.3	20.50
		157	1,026.9	772.0	12.50
		158	1,050.9	792.9	11.50
		159	1,057.4	801.8	13.50
		160	1,064.4	802.2	12.00
		161	1,074.7	807.4	11.50
Terrain Line35		167	1,017.7	792.0	12.50
		168	996.2	786.0	18.50

INPUT: TERRAIN LINES

Yerba Buena Island 08080090.11

	169	987.8	784.8	19.50
	170	979.8	783.7	20.50
	171	975.4	779.9	21.00
Terrain Line36	172	856.1	611.5	65.00
	173	895.4	623.0	57.50
	174	914.7	642.0	54.00
	175	922.7	641.4	52.00
	176	931.7	640.2	50.00
	177	943.2	632.3	48.00
Terrain Line37	178	886.6	610.1	58.00
	179	901.9	613.2	55.00
Terrain Line38	180	859.1	594.6	64.00
	181	875.4	593.9	60.00
	182	887.3	593.4	58.50
	183	901.8	591.4	56.00
Terrain Line39	184	783.7	476.6	87.00
	185	782.5	486.0	86.00
	186	790.7	502.0	82.00
	187	813.2	518.4	74.00
	188	820.2	527.2	70.00
	189	868.0	552.1	61.50
	190	885.8	570.3	58.70
	191	902.3	588.3	56.00
	192	914.6	597.3	54.00
Terrain Line46	214	793.0	430.2	103.00
	215	809.1	428.4	100.00
	216	827.3	439.8	89.00
	217	830.3	442.6	89.00
	218	838.8	456.3	72.00
	219	841.2	459.3	70.00
	220	838.5	469.1	69.00
Terrain Line47	221	782.1	440.8	103.50
	222	783.7	442.4	102.00
	223	797.3	470.1	88.00
	224	797.5	475.2	88.00
	225	804.3	488.2	80.00

INPUT: TERRAIN LINES

Yerba Buena Island 08080090.11

	226	817.6	492.0	73.00
	227	829.5	495.4	66.00
	228	846.2	497.2	56.00
Terrain Line49	229	730.1	434.6	103.50
	230	708.8	445.6	100.00
	231	690.7	458.1	96.00
	232	674.2	481.7	90.00
	233	672.0	486.3	88.00
Terrain Line60	283	810.9	312.7	64.00
	284	809.0	344.2	83.00
	285	809.5	347.6	83.00
	286	807.3	368.4	91.00
	287	807.8	373.3	92.00
	288	810.8	387.2	96.00
	289	812.9	395.1	100.00
	290	810.2	400.2	100.50
	291	808.0	415.5	101.00
Terrain Line61	292	842.9	392.4	100.00
	293	927.1	293.8	64.00
Terrain Line62	294	840.9	400.5	100.00
	295	892.0	398.3	88.00
	296	910.4	418.5	78.00
	297	921.7	445.7	68.00
	298	914.4	475.3	57.00
Terrain Line63	299	840.9	400.5	100.00
	300	862.6	407.0	94.00
	301	868.2	413.8	88.60
	302	869.7	417.8	83.30
	303	871.2	429.8	78.00
	304	867.6	448.9	69.00
	305	867.2	458.6	60.00
	306	857.5	463.5	56.00
Terrain Line64	307	704.4	355.8	74.00
	308	720.8	337.9	45.00
Terrain Line65	309	704.8	353.7	73.00
	310	691.7	331.7	35.00



INPUT: TERRAIN LINES

Yerba Buena Island 08080090.11

	311	642.7	268.9	28.00
	312	605.9	215.3	1.00
Terrain Line67	320	736.6	323.7	45.00
	321	764.3	305.5	63.50
Terrain Line68	322	637.9	185.4	28.00
	323	686.6	239.3	35.00
	324	725.5	278.7	50.00
	325	762.6	303.1	63.50
Terrain Line91	396	1,381.1	887.8	2.50
	397	1,388.2	888.0	0.50
Terrain Line92	398	1,255.4	835.2	4.80
	399	1,275.9	841.3	4.00
	400	1,302.6	857.7	21.50
	401	1,310.6	860.4	21.60
	402	1,319.0	863.7	21.80
	403	1,326.4	866.5	22.00
	404	1,342.1	870.6	8.00
	405	1,350.6	876.0	6.00
	406	1,359.8	876.3	3.50
Terrain Line93	407	1,374.2	884.6	3.50
	408	1,381.9	877.2	0.50
Terrain Line94	409	1,375.4	878.4	0.50
	410	1,370.7	880.7	3.50
Terrain Line95	411	1,367.1	875.0	3.50
	412	1,369.1	869.7	0.50
Terrain Line96	413	1,365.4	864.5	0.50
	414	1,361.8	867.1	3.00
Terrain Line97	415	1,359.7	853.1	0.50
	416	1,357.2	857.0	3.00
Terrain Line98	417	1,326.7	861.5	22.00
	418	1,336.5	858.0	6.00
	419	1,344.5	855.0	3.50
Terrain Line101	420	1,361.6	847.0	0.50
	421	1,353.4	848.2	3.00
Terrain Line104	520	1,229.0	777.5	2.80
	521	1,213.2	761.4	4.50

INPUT: TERRAIN LINES

Yerba Buena Island 08080090.11

		522	1,205.9	754.1	2.50
Terrain Line105		523	1,215.0	782.3	3.00
		524	1,205.8	777.1	5.50
Terrain Line106		525	1,180.2	792.7	7.00
		526	1,189.0	800.8	4.00
		527	1,194.2	799.2	3.50
Terrain Line107		528	1,194.9	244.3	0.50
		529	1,185.4	457.2	0.50
		530	1,235.9	464.7	0.50
		531	1,266.6	541.5	0.50
		532	1,257.8	544.8	0.50
		533	1,229.2	473.2	0.50
		534	1,227.5	473.0	0.50
		535	1,199.6	469.0	0.50
		536	1,180.9	466.2	0.50
		537	1,180.3	469.1	0.50
		538	1,174.9	498.9	0.50
		539	1,173.2	509.1	0.50
		540	1,173.2	512.1	0.50
		541	1,172.0	518.2	0.50
		542	1,171.9	521.6	0.50
		543	1,171.4	525.3	0.50
		544	1,171.3	529.7	0.50
		545	1,172.5	531.1	0.50
		546	1,172.3	533.2	0.50
		547	1,172.1	539.1	0.50
		548	1,171.6	541.1	0.50
		549	1,172.0	544.4	0.50
		550	1,173.2	555.6	0.50
		551	1,174.5	564.4	0.50
		552	1,175.3	573.2	0.50
		553	1,179.6	585.3	0.50
		554	1,183.1	596.3	0.50
		555	1,187.5	611.4	0.50
		556	1,187.8	614.8	0.50
		557	1,189.4	622.0	0.50

	558	1,189.8	623.7	0.50
	559	1,188.6	625.3	0.50
	560	1,188.8	627.1	0.50
	561	1,189.2	630.8	0.50
	562	1,190.0	632.5	0.50
	563	1,190.4	636.0	0.50
	564	1,190.3	639.4	0.50
	565	1,190.7	642.2	0.50
	566	1,191.1	647.4	0.50
	567	1,191.1	650.2	0.50
	568	1,191.0	654.0	0.50
	569	1,190.9	659.3	0.50
	570	1,191.1	662.8	0.50
	571	1,191.1	666.6	0.50
	572	1,190.2	668.1	0.50
	573	1,190.2	672.3	0.50
	574	1,190.4	679.4	0.50
	575	1,190.5	682.7	0.50
	576	1,190.9	685.9	0.50
	577	1,191.2	690.0	0.50
	578	1,191.4	692.6	0.50
	579	1,191.9	695.6	0.50
	580	1,192.7	700.8	0.50
	581	1,194.1	706.5	0.50
	582	1,195.5	712.2	0.50
	583	1,196.9	715.2	0.50
	584	1,197.2	717.2	0.50
	585	1,197.8	718.6	0.50
	586	1,200.2	720.8	0.50
	587	1,203.2	727.2	0.50
	588	1,204.1	729.8	0.50
	589	1,212.5	738.1	0.50
	590	1,221.0	746.1	0.50
	591	1,227.9	752.4	0.50
	592	1,233.7	756.7	0.50
	593	1,244.8	764.6	0.50



INPUT: TERRAIN LINES

	594	1,255.9	773.7	0.50
	595	1,258.1	775.0	0.50
	596	1,268.6	782.8	0.50
	597	1,280.0	790.9	0.50
	598	1,290.3	796.6	0.50
	599	1,303.1	804.8	0.50
	600	1,318.1	815.1	0.50
	601	1,324.4	818.4	0.50
	602	1,326.2	819.1	0.50
	603	1,327.8	819.2	0.50
	604	1,328.8	820.6	0.50
	605	1,330.4	820.3	0.50
	606	1,331.8	820.1	0.50
	607	1,332.5	818.7	0.50
	608	1,333.9	817.7	0.50
	609	1,335.2	818.5	0.50
	610	1,336.7	816.7	0.50
	611	1,337.6	815.9	0.50
	612	1,338.2	817.1	0.50
	613	1,337.6	818.8	0.50
	614	1,338.6	820.7	0.50
	615	1,341.8	822.5	0.50
	616	1,344.5	824.8	0.50
	617	1,349.8	825.0	0.50
	618	1,354.6	825.1	0.50
	619	1,358.7	826.3	0.50
	620	1,359.3	825.9	0.50
	621	1,365.3	836.6	0.50
	622	1,364.1	838.4	0.50
	623	1,362.9	840.3	0.50
	624	1,363.1	841.5	0.50
	625	1,360.5	844.2	0.50
Terrain Line108	626	1,181.9	757.8	6.50
	627	1,176.6	759.9	7.00
	628	1,166.9	766.8	8.00
Terrain Line109	629	1,163.8	737.6	3.50

INPUT: TERRAIN LINES

Yerba Buena Island 08080090.11

	630	1,166.1	743.2	4.00
	631	1,167.8	756.3	7.00
Terrain Line110	632	1,124.1	751.2	4.50
	633	1,137.2	754.8	8.00
	634	1,149.2	753.7	8.50
	635	1,148.0	748.0	7.50
	636	1,154.0	741.7	5.00
	637	1,158.8	736.2	3.50
Terrain Line111	638	1,121.0	740.9	8.00
	639	1,117.9	735.8	8.00
	640	1,117.5	726.6	7.50
	641	1,116.9	722.0	6.50
	642	1,118.4	712.7	3.50
Terrain Line112	643	1,105.0	721.6	3.50
	644	1,103.1	731.0	8.00
Terrain Line113	645	1,072.7	688.4	8.00
	646	1,078.7	687.3	3.00
	647	1,107.3	690.7	2.60
Terrain Line114	648	990.9	602.5	46.00
	649	1,048.9	663.1	8.00
	650	1,064.8	669.3	7.80
	651	1,069.6	668.8	7.50
	652	1,079.5	670.4	5.00
	653	1,087.5	672.6	4.00
	654	1,104.2	674.3	3.00
Terrain Line115	655	1,038.5	622.4	10.00
	656	1,057.4	641.7	7.00
	657	1,068.2	649.1	6.50
	658	1,078.2	648.0	3.50
	659	1,082.0	647.3	3.00
Terrain Line116	660	1,071.2	619.8	3.00
	661	1,063.3	619.9	6.50
Terrain Line117	662	1,061.5	576.9	6.00
	663	1,064.6	593.9	6.00
	664	1,067.4	607.7	6.00
	665	1,070.8	617.6	6.00

INPUT: TERRAIN LINES

Yerba Buena Island 08080090.11

Terrain Line118	666	982.9	544.4	49.00
	667	989.3	547.7	46.00
	668	999.8	555.6	46.00
	669	1,023.7	579.9	20.00
	670	1,038.7	588.3	10.00
	671	1,046.4	597.4	6.50
	672	1,062.2	594.6	6.00
Terrain Line119	673	1,007.5	504.4	47.50
	674	1,010.6	494.7	44.00
	675	1,014.9	493.3	43.50
	676	1,023.2	496.8	43.00
	677	1,069.9	515.7	10.00
	678	1,074.4	517.6	5.50
Terrain Line120	679	992.9	400.8	58.00
	680	1,006.1	412.7	50.00
	681	1,015.3	422.6	48.00
	682	1,023.7	431.6	46.00
	683	1,058.4	447.9	32.00
	684	1,083.4	468.6	10.00
	685	1,096.7	481.6	4.50
Terrain Line121	687	1,022.2	407.4	50.00
	688	1,055.4	413.0	40.00
	689	1,100.5	418.5	30.00
	690	1,136.9	455.0	3.50
Terrain Line122	691	1,028.9	370.3	48.00
	692	1,022.0	367.3	52.00
Terrain Line123	693	1,022.3	356.0	52.00
	694	1,030.1	356.4	48.00
	695	1,045.4	357.6	44.00
	696	1,111.6	368.9	30.00
	697	1,139.3	352.0	3.50
Terrain Line124	698	931.8	287.3	63.00
	699	939.6	267.2	52.00
Terrain Line125	700	623.1	170.0	0.50
	701	655.3	163.2	0.50
	702	675.3	159.5	0.50



INPUT: TERRAIN LINES

Yerba Buena Island 08080090.11

	703	720.1	166.3	0.50
	704	767.8	185.0	0.50
	705	817.2	188.4	0.50
	706	841.6	182.2	0.50
	707	858.7	164.0	0.50
	708	870.5	170.5	0.50
	709	933.0	169.7	0.50
	710	1,000.2	168.9	0.50
	711	1,029.7	161.6	0.50
	712	1,045.0	146.3	0.50
	713	1,064.6	126.7	0.50
	714	1,089.9	124.5	0.50
	715	1,113.2	129.6	0.50
	716	1,123.2	150.0	0.50
	717	1,133.4	182.6	0.50
	718	1,147.6	197.2	0.50
	719	1,158.0	201.2	0.50
	720	1,157.6	215.4	0.50
	721	1,182.2	241.8	0.50
Terrain Line126	722	873.5	285.5	60.00
	723	852.1	231.5	43.50
Terrain Line127	724	774.2	202.5	32.00
	725	771.7	229.2	39.00
	726	773.0	258.5	45.50
	727	783.0	281.8	50.00
	728	789.5	299.9	62.00
Terrain Line128	729	731.2	322.8	62.00
	730	585.5	155.4	62.00
	731	573.6	173.9	62.00
	732	714.3	330.2	62.00
Terrain Line129	733	731.8	322.4	45.00
	734	585.4	154.2	45.00
	735	572.8	174.0	45.00
	736	713.8	330.7	45.00
Terrain Line99-Terrain Line100	749	1,316.3	855.7	22.00
	750	1,317.0	850.3	12.00

INPUT: TERRAIN LINES

Yerba Buena Island 08080090.11

	751	1,318.4	839.6	3.50
Terrain Line40	752	735.6	450.1	103.50
	753	732.8	482.9	90.00
	754	747.1	487.5	86.50
	755	749.9	491.1	86.50
	756	750.6	493.1	86.50
	757	764.3	531.7	78.50
	758	759.0	550.4	75.50
	759	770.9	561.9	75.50
	760	769.7	567.1	74.00
	761	779.4	574.5	70.00
	762	790.9	603.2	68.00
Terrain Line30	763	1,079.1	831.3	11.00
	764	1,073.5	831.0	12.50
	765	1,060.1	827.9	13.50
	766	1,048.9	825.2	14.50
	767	1,039.4	825.3	13.50
	768	1,027.0	825.3	12.30
	769	1,014.9	823.9	11.80
	770	1,001.2	822.3	11.00
Terrain Line136	771	1,194.0	244.3	3.00
	772	1,184.9	457.6	3.00
	773	1,235.6	465.2	3.00
	774	1,266.0	541.2	3.00
	775	1,258.1	544.2	3.00
	776	1,229.6	472.7	3.00
	777	1,227.5	472.5	3.00
	778	1,199.7	468.5	3.00
	779	1,180.5	465.6	3.00
	780	1,179.8	469.0	3.00
	781	1,174.4	498.8	3.00
	782	1,172.7	509.1	3.00
	783	1,170.0	515.1	3.00
	784	1,169.7	519.3	3.00
	785	1,169.5	522.3	3.00
	786	1,168.3	525.4	3.00

	787	1,167.7	530.6	3.00
	788	1,167.4	534.2	3.00
	789	1,167.7	537.6	3.00
	790	1,168.1	540.8	3.00
	791	1,168.3	543.9	3.00
	792	1,167.8	546.3	3.00
	793	1,168.9	554.7	3.00
	794	1,170.9	566.0	3.00
	795	1,171.4	572.0	3.00
	796	1,173.6	580.4	3.00
	797	1,177.0	592.0	3.00
	798	1,181.4	606.3	3.00
	799	1,183.0	615.2	3.00
	800	1,183.4	622.6	3.00
	801	1,183.2	631.3	3.00
	802	1,183.4	633.6	3.00
	803	1,182.4	643.8	3.00
	804	1,183.0	646.5	3.00
	805	1,183.1	647.2	3.00
	806	1,184.0	655.7	3.00
	807	1,184.1	658.5	3.00
	809	1,184.2	660.1	3.00
	810	1,184.2	662.9	3.00
	811	1,184.1	666.7	3.00
	812	1,184.0	672.0	3.00
	813	1,184.2	675.5	3.00
	814	1,184.2	679.2	3.00
	815	1,183.3	680.6	3.00
	816	1,183.3	685.0	3.00
	817	1,183.9	690.2	3.00
	818	1,184.7	693.7	3.00
	819	1,186.4	697.2	3.00
	820	1,187.6	700.5	3.00
	821	1,188.5	704.7	3.00
	822	1,189.7	709.4	3.00
	823	1,190.3	712.9	3.00



	824	1,191.0	717.3	3.00
	825	1,192.2	721.2	3.00
	826	1,193.7	722.0	3.00
	827	1,194.4	723.6	3.00
	828	1,194.7	725.8	3.00
	829	1,194.2	728.5	3.00
	830	1,197.8	728.0	3.00
	831	1,199.9	731.9	3.00
	832	1,202.7	736.9	3.00
	833	1,205.2	742.3	3.00
	834	1,205.9	747.6	3.00
	835	1,209.3	752.7	3.00
	836	1,223.2	764.8	3.00
	837	1,229.4	767.7	3.00
	838	1,239.2	775.1	3.00
	839	1,257.9	788.1	3.00
	840	1,262.4	791.9	3.00
	841	1,267.0	794.0	3.00
	842	1,272.5	799.6	3.00
	843	1,294.5	811.0	3.00
	844	1,305.7	815.9	3.00
	845	1,312.6	820.8	3.00
	846	1,318.8	823.7	3.00
	847	1,323.2	825.6	3.00
	848	1,325.4	826.1	3.00
	849	1,333.6	825.3	3.00
	850	1,334.4	825.7	3.00
	851	1,335.4	827.4	3.00
	852	1,337.0	828.7	3.00
	853	1,338.4	828.8	3.00
	854	1,340.0	826.6	3.00
	855	1,344.4	825.1	3.00
	856	1,351.7	829.0	3.00
	857	1,359.1	833.1	3.00
	858	1,361.3	834.5	3.00
	864	1,360.8	836.6	3.00

	865	1,355.7	842.5	3.00
	868	1,354.4	844.7	3.00
Terrain Line137	869	993.1	522.3	48.00
	870	992.3	505.4	50.00
	871	992.1	495.6	52.00
	872	990.7	485.9	52.50
	873	990.2	474.8	53.00
	874	989.5	445.6	55.00
	875	992.4	419.6	58.00
	876	990.0	376.3	61.00
	877	989.9	347.9	62.00
	878	995.0	340.8	58.00
	879	998.9	335.5	57.00
	880	1,000.8	332.5	56.50
	881	1,002.4	329.8	56.00
Terrain Line138	882	1,002.5	407.0	52.00
	883	1,005.9	407.0	51.80
	884	1,015.3	407.0	51.80
	885	1,020.0	405.4	51.80
	886	1,021.9	402.4	51.80

INPUT: GROUND ZONES

EDAW/AECOM

Maddux, B.

13 August 2009

TNM 2.5

INPUT: GROUND ZONES

PROJECT/CONTRACT:

RUN:

Yerba Buena Island 08080090.11

Future Alternative 2B

Ground Zone Name	Type	Flow Resistivity cgs rayls	Points		
			No.	Coordinates	
				X	Y
				m	m
Ground Zone2	Lawn	300	1	989.3	451.3
			2	1,012.7	474.3
			3	1,043.0	472.6
			4	1,043.0	355.9
			5	1,110.3	368.6
			6	1,129.9	447.9
			7	1,096.2	481.1
			8	1,060.4	577.4
			9	1,071.9	619.1
			10	1,100.9	658.5
			11	1,050.6	684.5
			12	1,018.3	639.8
			13	991.4	604.4
			14	979.9	582.2
			15	979.9	558.8
			16	985.5	546.9
			17	995.7	517.9
			18	994.0	494.9



**EDAW/AECOM**  
**Maddux, B.**

20 October 2009  
TNM 2.5  
Calculated with

## RESULTS: SOUND LEVELS

**Yerba Buena Island 08080090.11  
Future Alternative 2B  
INPUT HEIGHTS**

**Average pavement type shall be used unless a State highway agency substantiates the use of a different type with approval of FHWA.**

20 deg C, 50% RH

Receiver														
Name	No.	#DUs	Existing LAeq1h	No Barrier		Increase over existing			Type Impact	With Barrier		Noise Reduction		Calculated minus Goal
				LAeq1h		Calculated	Crit'n	Sub'l Inc		Calculated LAeq1h	Calculated	Goal		
				Calculated	Crit'n								dB	
R-1		9	1	0.0	67.4	71	67.4	12	----	67.4	0.0	5	-5.0	
R-2 (ST-1)		16	1	0.0	68.4	71	68.4	12	----	68.4	0.0	5	-5.0	
R-3		17	1	0.0	72.7	66	72.7	12	Snd Lvl	72.7	0.0	5	-5.0	
R-4 (ST-3)		18	1	0.0	66.3	71	66.3	12	----	66.3	0.0	5	-5.0	
R-5		19	1	0.0	66.5	71	66.5	12	----	66.5	0.0	5	-5.0	
R-6		20	1	0.0	66.0	66	66.0	12	Snd Lvl	66.0	0.0	5	-5.0	
R-7		21	1	0.0	66.8	66	66.8	12	Snd Lvl	66.8	0.0	5	-5.0	
R-8		22	1	0.0	63.6	66	63.6	12	----	63.6	0.0	5	-5.0	
R-9		24	1	0.0	62.4	66	62.4	12	----	62.4	0.0	5	-5.0	
R-10 (ST-2)		25	1	0.0	65.2	72	65.2	12	----	65.2	0.0	5	-5.0	
R-11		38	1	0.0	53.4	66	53.4	12	----	53.4	0.0	5	-5.0	
R-12 (ST-4)		39	1	0.0	65.5	66	65.5	12	----	65.5	0.0	5	-5.0	
R-13 (ST-5)		40	1	0.0	57.5	66	57.5	12	----	57.5	0.0	5	-5.0	
R-14		41	1	0.0	65.3	66	65.3	12	----	65.3	0.0	5	-5.0	
R-15		42	1	0.0	63.6	66	63.6	12	----	63.6	0.0	5	-5.0	
R-16		43	1	0.0	72.4	71	72.4	12	Snd Lvl	72.4	0.0	5	-5.0	
R-17		54	1	0.0	60.9	71	60.9	12	----	60.9	0.0	5	-5.0	

Dwelling Units	# DUs	Noise Reduction		
		Min	Avg	Max
		dB	dB	dB
All Selected	17	0.0	0.0	0.0
All Impacted	4	0.0	0.0	0.0
All that meet NR Goal	0	0.0	0.0	0.0

## INPUT: ROADWAYS

Yerba Buena Island 08080090.11

EDAW/AECOM

Maddux B.

13 August 2009

TNM 2.5

## INPUT: ROADWAYS

PROJECT/CONTRACT:

Yerba Buena Island 08080090.11

RUN:

Future Alternative 4

Average pavement type shall be used unless  
a State highway agency substantiates the use  
of a different type with the approval of FHWA

Roadway		Points										Flow Control				Segment	
Name	Width	Name		No.	Coordinates (pavement)			X		Y	Z	Control Device	Speed Constraint	Percent Vehicles Affected	Pvmt Type	On Struct?	
	m																
SFOBB WB OFF SE	3.7	point82		70	971.1	592.8	58.00								Average		
		point81		71	929.3	546.5	57.00								Average		
		point80		72	884.6	498.2	57.00								Average		
		point79		73	884.0	493.9	57.00								Average		
		point78		74	885.1	490.1	57.00								Average		
		point77		75	887.5	487.3	57.00								Average		
		point76		76	899.1	483.8	57.00								Average		
		point75		77	914.4	479.1	57.00								Average		
		point74		78	929.8	473.0	56.50								Average		
		point73		79	943.5	465.6	56.00										
SFOBB EB OFF SE	3.7	point96		80	886.6	496.7	58.00								Average		
		point95		81	919.4	524.9	51.20								Average		
		point94		82	925.7	530.1	51.30								Average		
		point93		83	946.1	550.2	51.50								Average		
		point92		84	949.8	552.6	51.50								Average		
		point91		85	952.0	553.6	51.50								Average		
		point90		86	958.8	555.0	51.50								Average		
		point89		87	963.5	554.4	51.20								Average		
		point88		88	966.9	553.3	51.00								Average		
		point87		89	970.1	551.7	50.80								Average		
		point86		90	977.5	545.3	50.50								Average		
		point85		91	979.9	542.2	50.00								Average		
		point84		92	982.5	534.0	49.50								Average		
		point83		93	986.4	520.0	48.00										
SFOBB EB ON SE	3.7	point137		118	988.1	521.8	48.00					Onramp	0.00	100	Average		

			point136	119	984.2	536.2	49.50		Average
			point135	120	980.5	547.6	50.50		Average
			point134	121	976.7	558.8	51.00		Average
			point133	122	974.1	567.2	51.50		Average
			point132	123	973.6	572.5	51.50		Average
			point131	124	974.0	578.1	51.40		Average
			point130	125	974.6	580.7	51.40		Average
			point129	126	975.7	584.7	51.30		Average
			point128	127	981.1	597.1	51.40		Average
			point127	128	987.9	608.4	51.50		Average
			point126	129	995.6	619.1	51.70		Average
			point125	130	1,008.7	635.6	51.90		Average
			point124	131	1,018.4	646.7	52.00		
Treasure Is Rd - 2	3.7		point164	132	985.1	519.1	48.00		Average
			point163	133	986.0	503.2	48.00		Average
			point162	134	984.4	452.2	53.50		Average
			point161	135	979.4	378.0	60.50		Average
			point160	136	975.4	356.4	61.50		Average
			point159	137	961.6	319.8	63.00		Average
			point158	138	950.8	306.7	63.50		Average
			point157	139	935.5	296.0	64.00		Average
			point156	140	921.7	290.2	64.00		Average
			point155	141	904.0	289.3	60.50		Average
			point154	142	896.6	291.0	60.80		Average
			point153	143	798.8	311.0	62.50		Average
			point152	144	776.7	316.4	62.20		Average
			point151	145	769.7	319.5	62.00		Average
			point150	146	728.3	352.1	71.50		Average
			point149	147	707.3	362.0	72.80		Average
			point148	148	694.4	363.4	74.00		Average
			point147	149	683.5	362.8	73.00		Average
			point146	150	671.9	360.6	72.50		Average
			point145	151	660.7	356.8	71.50		Average
			point144	152	654.9	355.4	70.00		Average
			point143	153	602.5	340.2	63.00		Average
			point142	154	591.8	337.9	62.00		Average
			point141	155	582.9	336.9	61.00		Average
			point140	156	571.6	337.4	60.00		Average
			point139	157	557.7	340.8	57.50		Average



INPUT: ROADWAYS

Yerba Buena Island 08080090.11

Treasure Is Rd - 1	3.7	point186	160	556.4	336.6	57.50			Average
		point185	161	571.0	332.7	60.00			Average
		point184	162	583.3	332.3	61.00			Average
		point183	163	594.8	332.7	62.00			Average
		point182	164	664.7	354.5	71.00			Average
		point181	165	676.6	357.9	72.50			Average
		point180	166	686.6	359.0	73.00			Average
		point179	167	694.3	359.5	74.00			Average
		point178	168	706.9	358.4	72.80			Average
		point177	169	726.5	348.7	71.50			Average
		point176	170	767.9	316.6	62.00			Average
		point175	171	776.8	312.8	62.20			Average
		point174	172	904.5	285.9	60.00			Average
		point173	173	924.4	287.5	64.00			Average
		point172	174	940.3	294.3	64.00			Average
		point171	175	956.4	306.2	63.50			Average
		point170	176	966.8	319.1	63.00			Average
		point169	177	975.3	338.1	61.00			Average
		point168	178	980.9	359.6	61.50			Average
		point167	179	983.1	378.2	60.50			Average
		point166	180	990.1	506.3	48.50			Average
		point165	181	988.9	518.9	48.00			
Macalla Rd - 1	3.7	point359	263	1,124.1	467.5	3.50			Average
		point358	264	1,111.4	473.9	4.00			Average
		point357	265	1,098.7	489.2	4.50			Average
		point356	266	1,089.0	516.7	5.00			Average
		point355	267	1,081.7	537.9	5.40			Average
		point354	268	1,073.4	555.5	5.60			Average
		point353	269	1,070.6	565.0	5.80			Average
		point352	270	1,070.8	576.7	5.70			Average
		point351	271	1,074.8	593.1	5.50			Average
		point350	272	1,085.1	615.7	4.00			Average
		point349	273	1,095.2	630.9	3.50			Average
		point348	274	1,107.1	644.5	3.50			Average
		point347	275	1,111.6	649.3	3.50			Average
		point346	276	1,128.6	669.7	3.50			Average
		point345	277	1,137.6	681.0	3.50			Average
		point344	278	1,163.4	712.1	3.50			Average
		point343	279	1,182.9	735.2	4.00			Average

			point342	280	1,190.3	745.6	4.20		Average
			point341	281	1,195.2	752.6	4.50		Average
			point340	282	1,198.5	763.6	5.00		Average
			point339	283	1,197.7	770.3	5.50		Average
			point338	284	1,195.7	776.6	6.00		Average
			point337	285	1,188.6	784.5	6.50		Average
			point335	287	1,172.5	792.6	7.00		Average
			point334	288	1,142.9	805.1	8.60		Average
			point333	289	1,134.1	812.4	8.70		Average
			point332	290	1,120.5	831.3	8.80		Average
			point331	291	1,110.0	846.8	9.00		Average
			point330	292	1,100.5	860.4	9.10		Average
			point329	293	1,094.9	866.9	9.30		Average
			point328	294	1,089.0	870.5	9.30		Average
			point327	295	1,074.9	873.3	9.50		Average
			point326	296	1,058.3	874.8	10.00		Average
			point325	297	1,043.2	875.2	10.20		Average
			point324	298	1,028.0	874.8	10.50		Average
			point323	299	1,000.9	872.0	12.50		Average
			point322	300	965.5	867.9	15.00		Average
			point321	301	930.5	860.9	16.50		Average
			point320	302	910.8	850.2	18.00		Average
			point319	303	885.7	829.5	20.00		Average
			point318	304	876.1	814.3	21.50		Average
			point317	305	871.2	791.0	23.50		Average
			point316	306	873.5	776.2	25.50		Average
			point315	307	885.0	756.1	26.00		Average
			point314	308	894.1	744.9	26.50		Average
			point313	309	897.0	736.5	26.70		Average
			point312	310	890.0	728.2	28.00		Average
			point311	311	869.1	729.3	28.20		Average
			point310	312	838.6	726.6	30.20		Average
			point309	313	808.0	727.5	31.50		Average
			point308	314	797.1	724.0	32.30		Average
			point307	315	795.4	713.2	32.50		Average
			point306	316	801.7	704.8	32.80		Average
			point305	317	808.3	703.5	33.00		Average
			point304	318	837.9	709.9	34.50		Average
			point303	319	856.4	708.7	35.50		Average

		point302	320	875.3	703.6	36.50			Average
		point301	321	946.4	678.3	40.50			Average
		point300	322	967.0	665.8	42.50			Average
		point299	323	975.1	657.4	43.50			Average
		point298	324	975.4	649.8	44.80			Average
		point297	325	970.6	644.2	45.50			Average
		point296	326	963.7	642.0	46.00			Average
		point295	327	954.1	643.0	47.50			Average
		point294	328	909.2	655.7	52.00			Average
		point293	329	863.1	668.1	56.50			Average
		point292	330	851.7	668.3	57.50			Average
		point291	331	838.7	666.6	58.50			Average
		point290	332	822.7	661.3	59.50			Average
		point289	333	790.9	647.9	65.00			Average
		point288	334	781.7	638.5	66.00			Average
		point287	335	776.7	627.2	66.20			Average
		point286	336	775.1	615.1	66.50			Average
		point285	337	763.7	595.8	67.50			Average
		point284	338	749.0	584.6	68.50			Average
		point283	339	730.6	577.1	69.50			Average
		point282	340	711.5	575.6	70.00			Average
		point281	341	688.8	580.4	70.50			Average
		point280	342	671.1	587.3	71.00			Average
		point279	343	658.3	586.9	70.60			Average
		point278	344	635.8	585.6	70.30			Average
		point277	345	618.9	584.9	70.00			Average
		point276	346	610.5	587.9	68.50			Average
		point275	347	590.6	604.4	67.50			
Forest Rd - 1	3.7	point370	354	623.6	468.2	92.00			Average
		point369	355	624.3	463.0	92.50			Average
		point368	356	629.2	458.1	92.00			Average
		point367	357	639.7	452.1	91.00			Average
		point366	358	653.3	443.1	90.50			Average
		point365	359	657.8	439.3	90.00			Average
		point364	360	673.3	420.0	90.00			Average
		point363	361	678.0	415.8	90.00			Average
		point362	362	693.7	404.9	90.00			Average
		point361	363	712.9	394.2	91.00			Average
		point360	364	731.8	386.5	90.00			



INPUT: ROADWAYS

Yerba Buena Island 08080090.11

Forest Rd - 2	3.7	point371	365	732.6	388.4	90.00	Average
		point372	366	713.7	396.1	91.00	Average
		point373	367	694.7	406.6	90.00	Average
		point374	368	679.3	417.4	90.00	Average
		point375	369	674.7	421.4	90.00	Average
		point376	370	659.2	440.7	90.00	Average
		point377	371	654.5	444.7	90.50	Average
		point378	372	640.8	453.8	90.00	Average
		point379	373	630.4	459.7	92.00	Average
		point380	374	626.2	463.9	92.50	Average
		point381	375	625.6	468.5	92.00	
Signal Rd - 1	3.7	point394	376	628.6	466.7	92.00	Average
		point393	377	641.6	461.7	91.50	Average
		point392	378	668.2	456.6	94.50	Average
		point391	379	674.0	454.2	94.80	Average
		point390	380	708.1	430.4	98.00	Average
		point389	381	752.6	412.0	99.50	Average
		point388	382	762.9	408.4	100.20	Average
		point387	383	777.7	407.1	101.50	Average
		point386	384	789.1	412.5	102.50	Average
		point385	385	792.9	422.4	103.00	Average
		point384	386	789.3	432.7	103.20	Average
		point383	387	781.8	439.0	103.50	Average
		point382	388	764.6	441.0	103.80	
Signal Rd - 2	3.7	point406	389	764.6	438.7	103.80	Average
		point405	390	781.7	436.9	103.50	Average
		point404	391	787.9	431.6	103.20	Average
		point403	392	790.4	422.7	103.00	Average
		point402	393	786.8	414.4	102.50	Average
		point401	394	777.5	410.1	101.50	Average
		point400	395	762.9	411.2	100.20	Average
		point399	396	708.5	432.8	98.00	Average
		point398	397	675.4	456.1	94.80	Average
		point397	398	668.9	458.7	94.50	Average
		point396	399	641.9	463.8	91.50	Average
		point395	400	629.9	468.6	92.00	Average
SFOBB WB - 3	7.3	point668	668	1,553.4	1,058.5	58.00	Average Y
		point667	667	1,444.4	1,022.8	58.00	Average Y
		point666	666	1,355.7	983.9	58.00	Average Y

			point626	626	1,266.5	925.5	58.50		Average	Y
			point625	625	1,244.7	909.5	59.70		Average	Y
			point624	624	1,209.3	881.4	59.80		Average	Y
			point623	623	1,184.1	859.5	60.00		Average	Y
			point622	622	1,141.5	818.3	60.20		Average	Y
			point621	621	1,112.6	787.8	60.50		Average	Y
			point620	620	1,083.8	753.4	60.40		Average	Y
			point619	619	1,061.4	723.7	60.20		Average	Y
			point618	618	1,048.6	705.0	60.00		Average	Y
			point617	617	988.2	619.9	56.70		Average	Y
			point616	616	969.4	597.5	56.60		Average	Y
			point615	615	951.9	577.6	56.50		Average	Y
			point614	614	864.5	478.7	56.00		Average	Y
			point613	613	851.3	463.7	56.00			
SFOBB WB - 2	7.3		point664	664	1,551.8	1,063.3	58.00		Average	Y
			point663	663	1,442.4	1,028.5	58.00		Average	Y
			point662	662	1,352.8	990.0	58.00		Average	Y
			point612	612	1,262.4	931.1	58.50		Average	Y
			point611	611	1,240.5	915.1	59.70		Average	Y
			point610	610	1,204.9	886.8	59.80		Average	Y
			point609	609	1,179.4	864.6	60.00		Average	Y
			point608	608	1,136.5	823.2	60.20		Average	Y
			point607	607	1,107.4	792.4	60.50		Average	Y
			point606	606	1,078.4	757.7	60.40		Average	Y
			point605	605	1,055.8	727.8	60.20		Average	Y
			point604	604	1,042.9	709.0	60.00		Average	Y
			point603	603	982.7	624.2	56.70		Average	Y
			point602	602	964.2	602.1	56.60		Average	Y
			point601	601	946.6	582.2	56.50		Average	Y
			point600	600	859.3	483.3	56.00		Average	Y
			point599	599	846.0	468.3	56.00			
SFOBB WB - 1	7.3		point660	660	1,551.3	1,067.4	58.00		Average	
			point659	659	1,441.3	1,033.4	58.00		Average	Y
			point658	658	1,351.6	995.1	58.00		Average	Y
			point596	596	1,258.3	936.8	58.50		Average	Y
			point595	595	1,236.2	920.6	59.70		Average	Y
			point594	594	1,200.4	892.2	59.80		Average	Y
			point593	593	1,174.7	869.8	60.00		Average	Y
			point592	592	1,131.5	828.1	60.20		Average	Y

			point591	591	1,102.2	797.1	60.50	Average	Y
			point590	590	1,072.9	762.1	60.40	Average	Y
			point589	589	1,050.1	731.9	60.20	Average	Y
			point588	588	1,037.2	713.0	60.00	Average	Y
			point587	587	977.1	628.5	56.70	Average	Y
			point586	586	958.9	606.6	56.60	Average	Y
			point585	585	941.4	586.9	56.50	Average	Y
			point584	584	854.1	487.9	56.00	Average	Y
			point583	583	840.8	473.0	56.00		
SFOBB EB - 1	7.3		point636	636	841.0	470.8	50.00	Average	Y
			point635	635	885.6	521.5	51.50	Average	Y
			point634	634	925.6	563.7	53.00	Average	Y
			point633	633	997.7	646.8	53.50	Average	Y
			point632	632	1,070.2	729.7	53.70	Average	Y
			point631	631	1,114.7	775.7	54.00	Average	Y
			point630	630	1,133.8	791.6	54.50	Average	Y
			point629	629	1,181.8	828.2	55.00	Average	Y
			point628	628	1,216.2	857.6	55.50	Average	Y
			point669	669	1,279.1	904.6	56.00	Average	Y
			point670	670	1,371.5	962.9	56.50	Average	Y
			point671	671	1,457.8	999.3	56.70	Average	Y
			point672	672	1,564.3	1,032.9	57.00		
SFOBB EB - 2	7.3		point646	646	846.3	466.2	50.00	Average	Y
			point645	645	890.8	516.8	51.50	Average	Y
			point644	644	930.7	559.0	53.00	Average	Y
			point643	643	1,003.0	642.2	53.50	Average	Y
			point642	642	1,075.3	725.0	53.70	Average	Y
			point641	641	1,119.4	770.6	54.00	Average	Y
			point640	640	1,138.2	786.2	54.50	Average	Y
			point639	639	1,186.2	822.8	55.00	Average	Y
			point638	638	1,220.6	852.2	55.50	Average	Y
			point673	673	1,283.3	899.0	56.00	Average	Y
			point674	674	1,375.5	956.8	56.50	Average	Y
			point675	675	1,461.4	992.4	56.70	Average	Y
			point676	676	1,566.7	1,026.1	57.00		
SFOBB EB - 3	7.3		point656	656	851.5	461.6	50.00	Average	Y
			point655	655	895.9	512.1	51.50	Average	Y
			point654	654	935.9	554.4	53.00	Average	Y
			point653	653	1,008.2	637.6	53.50	Average	Y



## INPUT: ROADWAYS

Yerba Buena Island 08080090.11

		point652	652	1,080.5	720.3	53.70		Average	Y
		point651	651	1,124.2	765.5	54.00		Average	Y
		point650	650	1,142.5	780.7	54.50		Average	Y
		point649	649	1,190.6	817.3	55.00		Average	Y
		point648	648	1,224.9	846.7	55.50		Average	Y
		point677	677	1,287.5	893.4	56.00		Average	Y
		point678	678	1,379.6	949.5	56.50		Average	Y
		point679	679	1,465.1	986.0	56.70		Average	Y
		point680	680	1,568.8	1,019.6	57.00		Average	Y
SFOBB WB OFF NE	3.7	point775	775	1,252.8	935.7	58.00		Average	Y
		point774	774	1,211.5	909.2	58.50		Average	Y
		point773	773	1,184.1	889.9	59.00		Average	Y
		point772	772	1,153.7	866.7	59.50		Average	Y
		point771	771	1,132.3	848.1	59.50		Average	Y
		point770	770	1,111.2	827.1	58.00		Average	Y
		point769	769	1,080.4	789.4	54.00		Average	Y
		point768	768	1,055.9	761.1	51.00		Average	Y
		point767	767	1,014.6	714.0	46.00		Average	Y
		point766	766	995.7	690.5	44.50		Average	Y
		point765	765	988.0	680.0	44.40		Average	Y
		point764	764	974.9	664.8	44.20			
SFOBB WB ON NE	3.7	point776	776	991.5	518.7	48.00	Onramp 0.00	Average	
		point777	777	986.9	549.4	47.00		Average	Y
		point763	763	990.7	560.8	45.00		Average	Y
		point762	762	1,051.4	641.1	43.50		Average	Y
		point761	761	1,072.7	669.6	41.00		Average	Y
		point760	760	1,102.4	705.2	38.50		Average	Y
		point759	759	1,130.8	734.1	36.00		Average	Y
		point758	758	1,143.3	746.0	35.00		Average	Y
		point757	757	1,173.1	773.1	33.50		Average	Y
		point756	756	1,198.9	796.8	33.50		Average	Y
		point755	755	1,227.6	822.8	35.00		Average	Y
		point754	754	1,238.9	833.6	36.00		Average	Y
		point753	753	1,246.2	845.1	37.00		Average	Y
		point752	752	1,250.2	857.6	38.00		Average	Y
		point751	751	1,251.2	870.7	39.00		Average	Y
		point750	750	1,249.0	883.6	40.00		Average	Y
		point749	749	1,243.5	895.6	41.00		Average	Y
		point748	748	1,235.2	906.0	42.00		Average	Y

		point747	747	1,218.6	917.0	43.50	Average	Y
		point746	746	1,205.4	920.4	44.50	Average	Y
		point745	745	1,185.5	919.3	46.00	Average	Y
		point744	744	1,172.7	914.0	47.00	Average	Y
		point743	743	1,161.8	905.4	48.00	Average	Y
		point742	742	1,151.9	896.8	49.00	Average	Y
		point741	741	1,142.4	888.4	50.00	Average	Y
		point740	740	1,133.0	878.7	51.00	Average	Y
		point739	739	1,124.1	869.8	52.00	Average	Y
		point738	738	1,111.3	856.1	53.50	Average	Y
		point737	737	1,098.9	842.2	55.00	Average	Y
		point736	736	1,083.4	822.4	57.00	Average	Y
		point735	735	1,071.2	804.5	58.00	Average	Y
		point734	734	1,061.5	790.5	59.50	Average	Y
		point733	733	1,049.8	771.9	60.50	Average	Y
		point732	732	1,040.0	753.1	61.00	Average	Y
		point731	731	1,015.4	707.4	61.00	Average	Y
		point730	730	1,000.3	679.1	60.50	Average	Y
		point729	729	984.4	653.0	60.00	Average	Y
		point728	728	968.3	629.9	59.50	Average	Y
		point727	727	947.0	603.3	59.30	Average	Y
		point726	726	933.9	586.6	59.20	Average	Y
		point725	725	915.0	563.6	59.10	Average	Y
		point724	724	838.4	473.2	59.00		
North Gate Rd - 2	3.7	point779	779	974.6	640.0	45.50	Average	
		point242	208	980.6	648.5	44.80	Average	
		point241	209	978.9	658.9	43.50	Average	
		point240	210	974.3	664.4	43.00	Average	
		point239	211	968.3	668.3	42.00	Average	
		point238	212	946.7	679.7	40.50	Average	
		point237	213	920.0	690.1	38.50	Average	
		point236	214	903.8	696.0	38.00	Average	
		point235	215	874.7	706.7	36.50	Average	
		point234	216	856.7	711.6	35.50	Average	
		point233	217	837.9	712.7	34.50	Average	
		point232	218	808.2	706.6	33.00	Average	
		point231	219	802.6	707.5	32.80	Average	
		point230	220	798.2	714.0	32.50	Average	
		point229	221	799.2	722.3	32.80	Average	

	point228	222	808.3	725.7	31.50		Average
	point227	223	838.9	724.6	30.20		Average
	point226	224	869.2	727.4	28.20		Average
	point225	225	891.3	726.1	28.00		Average
	point224	226	899.9	736.4	26.70		Average
	point223	227	896.7	745.8	26.50		Average
	point222	228	887.6	757.5	26.00		Average
	point221	229	875.8	776.9	25.50		Average
	point220	230	873.5	791.2	23.50		Average
	point219	231	878.3	813.9	21.50		Average
	point218	232	887.7	828.1	20.00		Average
	point217	233	912.6	848.7	18.00		Average
	point216	234	931.5	858.7	16.50		Average
	point215	235	966.3	865.7	15.00		Average
	point214	236	1,029.0	871.4	10.50		Average
	point213	237	1,059.1	870.7	10.00		Average
	point212	238	1,075.1	869.6	9.50		Average
	point211	239	1,088.1	866.9	9.30		Average
	point210	240	1,092.6	863.7	9.30		Average
	point209	241	1,105.7	847.3	9.00		Average
	point208	242	1,132.0	810.7	8.70		Average
	point207	243	1,140.5	802.3	8.60		Average
	point206	244	1,171.5	789.1	7.00		Average
	point205	245	1,185.8	782.0	6.50		Average
	point204	246	1,191.4	775.4	6.00		Average
	point203	247	1,192.7	771.5	5.50		Average
	point202	248	1,193.2	765.2	5.00		Average
	point201	249	1,191.2	756.4	4.50		Average
	point200	250	1,177.4	740.0	4.00		Average
	point199	251	1,167.8	727.2	3.60		Average
	point198	252	1,158.1	712.1	3.50		Average
	point197	253	1,092.8	633.7	3.50		Average
	point196	254	1,080.9	616.6	4.00		Average
	point195	255	1,070.5	593.7	5.50		Average
	point194	256	1,067.2	577.5	5.70		Average
	point193	257	1,066.7	564.7	5.80		Average
	point192	258	1,070.5	554.0	5.60		Average
	point191	259	1,079.2	537.3	5.40		Average
	point190	260	1,096.3	488.5	4.50		Average



			point189	261	1,109.6	471.9	4.00			Average
			point188	262	1,122.5	464.6	3.50			
Macalla - 2	3.7		point664	781	589.2	601.8	67.50			Average
			point262	782	608.9	584.9	68.50			Average
			point261	783	619.0	581.8	70.00			Average
			point260	784	649.0	583.5	71.00			Average
			point259	785	671.1	584.4	71.00			Average
			point258	786	687.7	577.3	70.50			Average
			point257	787	711.7	572.7	70.00			Average
			point256	788	731.9	574.3	69.50			Average
			point255	789	750.7	582.4	68.50			Average
			point254	790	765.5	593.8	67.50			Average
			point253	791	778.2	614.7	66.50			Average
			point252	792	780.7	627.7	66.20			Average
			point251	793	784.5	637.3	66.00			Average
			point250	794	792.7	645.2	65.00			Average
			point249	795	824.3	658.8	58.50			Average
			point248	796	840.9	664.0	58.50			Average
			point247	797	852.9	665.3	57.50			Average
			point246	798	862.9	665.1	56.50			Average
			point245	799	953.4	637.5	47.50			Average
			point244	800	965.0	636.8	46.50			Average
			point243	801	974.6	640.0	45.50			

INPUT: TRAFFIC FOR LAeq1h Volumes

Yerba Buena Island 08080090.11

EDAW/AECOM  
Maddux B.13 August 2009  
TNM 2.5INPUT: TRAFFIC FOR LAeq1h Volumes  
PROJECT/CONTRACT:  
RUN:Yerba Buena Island 08080090.11  
Future Alternative 4

Roadway Name	Points Name	No.	Segment		Autos		MTrucks		HTTrucks		Buses		Motorcycles	
			V	S	veh/hr	km/h	V	S	veh/hr	km/h	V	S	veh/hr	km/h
SFOBB WB OFF SE	point82	70	314	88	88	88	4	88	5	88	0	0	0	0
	point81	71	314	88	88	88	4	88	5	88	0	0	0	0
	point80	72	314	88	88	88	4	88	5	88	0	0	0	0
	point79	73	314	88	88	88	4	88	5	88	0	0	0	0
	point78	74	314	88	88	88	4	88	5	88	0	0	0	0
	point77	75	314	88	88	88	4	88	5	88	0	0	0	0
	point76	76	314	88	88	88	4	88	5	88	0	0	0	0
	point75	77	314	88	88	88	4	88	5	88	0	0	0	0
	point74	78	314	88	88	88	4	88	5	88	0	0	0	0
SFOBB EB OFF SE	point73	79												
	point96	80	248	88	88	88	3	88	4	88	0	0	0	0
	point95	81	248	88	88	88	3	88	4	88	0	0	0	0
	point94	82	248	88	88	88	3	88	4	88	0	0	0	0
	point93	83	248	88	88	88	3	88	4	88	0	0	0	0
	point92	84	248	88	88	88	3	88	4	88	0	0	0	0
	point91	85	248	88	88	88	3	88	4	88	0	0	0	0
	point90	86	248	88	88	88	3	88	4	88	0	0	0	0
	point89	87	248	88	88	88	3	88	4	88	0	0	0	0
	point88	88	248	88	88	88	3	88	4	88	0	0	0	0
	point87	89	248	88	88	88	3	88	4	88	0	0	0	0
	point86	90	248	88	88	88	3	88	4	88	0	0	0	0
	point85	91	248	88	88	88	3	88	4	88	0	0	0	0
	point84	92	248	88	88	88	3	88	4	88	0	0	0	0





	point143	153	340	65	7	65	3	65	0	0	0
	point142	154	340	65	7	65	3	65	0	0	0
	point141	155	340	65	7	65	3	65	0	0	0
	point140	156	340	65	7	65	3	65	0	0	0
	point139	157									
Treasure Is Rd - 1	point186	160	340	65	7	65	3	65	0	0	0
	point185	161	340	65	7	65	3	65	0	0	0
	point184	162	340	65	7	65	3	65	0	0	0
	point183	163	340	65	7	65	3	65	0	0	0
	point182	164	340	65	7	65	3	65	0	0	0
	point181	165	340	65	7	65	3	65	0	0	0
	point180	166	340	65	7	65	3	65	0	0	0
	point179	167	340	65	7	65	3	65	0	0	0
	point178	168	340	65	7	65	3	65	0	0	0
	point177	169	340	65	7	65	3	65	0	0	0
	point176	170	340	65	7	65	3	65	0	0	0
	point175	171	340	65	7	65	3	65	0	0	0
	point174	172	340	65	7	65	3	65	0	0	0
	point173	173	340	65	7	65	3	65	0	0	0
	point172	174	340	65	7	65	3	65	0	0	0
	point171	175	340	65	7	65	3	65	0	0	0
	point170	176	340	65	7	65	3	65	0	0	0
	point169	177	340	65	7	65	3	65	0	0	0
	point168	178	340	65	7	65	3	65	0	0	0
	point167	179	340	65	7	65	3	65	0	0	0
	point166	180	340	65	7	65	3	65	0	0	0
	point165	181									
Macalla Rd - 1	point359	263	340	40	7	40	3	40	0	0	0
	point358	264	340	40	7	40	3	40	0	0	0
	point357	265	340	40	7	40	3	40	0	0	0
	point356	266	340	40	7	40	3	40	0	0	0
	point355	267	340	40	7	40	3	40	0	0	0
	point354	268	340	40	7	40	3	40	0	0	0
	point353	269	340	40	7	40	3	40	0	0	0
	point352	270	340	40	7	40	3	40	0	0	0
	point351	271	340	40	7	40	3	40	0	0	0

point350	272	340	40	7	40	3	40	0	0	0
point349	273	340	40	7	40	3	40	0	0	0
point348	274	340	40	7	40	3	40	0	0	0
point347	275	340	40	7	40	3	40	0	0	0
point346	276	340	40	7	40	3	40	0	0	0
point345	277	340	40	7	40	3	40	0	0	0
point344	278	340	40	7	40	3	40	0	0	0
point343	279	340	40	7	40	3	40	0	0	0
point342	280	340	40	7	40	3	40	0	0	0
point341	281	340	40	7	40	3	40	0	0	0
point340	282	340	40	7	40	3	40	0	0	0
point339	283	340	40	7	40	3	40	0	0	0
point338	284	340	40	7	40	3	40	0	0	0
point337	285	340	40	7	40	3	40	0	0	0
point335	287	340	40	7	40	3	40	0	0	0
point334	288	340	40	7	40	3	40	0	0	0
point333	289	340	40	7	40	3	40	0	0	0
point332	290	340	40	7	40	3	40	0	0	0
point331	291	340	40	7	40	3	40	0	0	0
point330	292	340	40	7	40	3	40	0	0	0
point329	293	340	40	7	40	3	40	0	0	0
point328	294	340	40	7	40	3	40	0	0	0
point327	295	340	40	7	40	3	40	0	0	0
point326	296	340	40	7	40	3	40	0	0	0
point325	297	340	40	7	40	3	40	0	0	0
point324	298	340	40	7	40	3	40	0	0	0
point323	299	340	40	7	40	3	40	0	0	0
point322	300	340	40	7	40	3	40	0	0	0
point321	301	340	40	7	40	3	40	0	0	0
point320	302	340	40	7	40	3	40	0	0	0
point319	303	340	40	7	40	3	40	0	0	0
point318	304	340	40	7	40	3	40	0	0	0
point317	305	340	40	7	40	3	40	0	0	0
point316	306	340	40	7	40	3	40	0	0	0
point315	307	340	40	7	40	3	40	0	0	0
point314	308	340	40	7	40	3	40	0	0	0

INPUT: TRAFFIC FOR LAeq1h Volumes

Yerba Buena Island 08080090.11

point313	309	340	40	7	40	3	40	0	0	0
point312	310	340	40	7	40	3	40	0	0	0
point311	311	340	40	7	40	3	40	0	0	0
point310	312	340	40	7	40	3	40	0	0	0
point309	313	340	40	7	40	3	40	0	0	0
point308	314	340	40	7	40	3	40	0	0	0
point307	315	340	40	7	40	3	40	0	0	0
point306	316	340	40	7	40	3	40	0	0	0
point305	317	340	40	7	40	3	40	0	0	0
point304	318	340	40	7	40	3	40	0	0	0
point303	319	340	40	7	40	3	40	0	0	0
point302	320	340	40	7	40	3	40	0	0	0
point301	321	340	40	7	40	3	40	0	0	0
point300	322	340	40	7	40	3	40	0	0	0
point299	323	340	40	7	40	3	40	0	0	0
point298	324	340	40	7	40	3	40	0	0	0
point297	325	340	40	7	40	3	40	0	0	0
point296	326	340	40	7	40	3	40	0	0	0
point295	327	340	40	7	40	3	40	0	0	0
point294	328	340	40	7	40	3	40	0	0	0
point293	329	340	40	7	40	3	40	0	0	0
point292	330	340	40	7	40	3	40	0	0	0
point291	331	340	40	7	40	3	40	0	0	0
point290	332	340	40	7	40	3	40	0	0	0
point289	333	340	40	7	40	3	40	0	0	0
point288	334	340	40	7	40	3	40	0	0	0
point287	335	340	40	7	40	3	40	0	0	0
point286	336	340	40	7	40	3	40	0	0	0
point285	337	340	40	7	40	3	40	0	0	0
point284	338	340	40	7	40	3	40	0	0	0
point283	339	340	40	7	40	3	40	0	0	0
point282	340	340	40	7	40	3	40	0	0	0
point281	341	340	40	7	40	3	40	0	0	0
point280	342	340	40	7	40	3	40	0	0	0
point279	343	340	40	7	40	3	40	0	0	0
point278	344	340	40	7	40	3	40	0	0	0



	point277	345	340	40	7	40	3	40	0	0	0	0
	point276	346	340	40	7	40	3	40	0	0	0	0
	point275	347										
Forest Rd - 1	point370	354	12	25	0	0	0	0	0	0	0	0
	point369	355	12	25	0	0	0	0	0	0	0	0
	point368	356	12	25	0	0	0	0	0	0	0	0
	point367	357	12	25	0	0	0	0	0	0	0	0
	point366	358	12	25	0	0	0	0	0	0	0	0
	point365	359	12	25	0	0	0	0	0	0	0	0
	point364	360	12	25	0	0	0	0	0	0	0	0
	point363	361	12	25	0	0	0	0	0	0	0	0
	point362	362	12	25	0	0	0	0	0	0	0	0
	point361	363	12	25	0	0	0	0	0	0	0	0
	point360	364										
Forest Rd - 2	point371	365	12	25	0	0	0	0	0	0	0	0
	point372	366	12	25	0	0	0	0	0	0	0	0
	point373	367	12	25	0	0	0	0	0	0	0	0
	point374	368	12	25	0	0	0	0	0	0	0	0
	point375	369	12	25	0	0	0	0	0	0	0	0
	point376	370	12	25	0	0	0	0	0	0	0	0
	point377	371	12	25	0	0	0	0	0	0	0	0
	point378	372	12	25	0	0	0	0	0	0	0	0
	point379	373	12	25	0	0	0	0	0	0	0	0
	point380	374	12	25	0	0	0	0	0	0	0	0
	point381	375										
Signal Rd - 1	point394	376	10	40	0	0	0	0	0	0	0	0
	point393	377	10	40	0	0	0	0	0	0	0	0
	point392	378	10	40	0	0	0	0	0	0	0	0
	point391	379	10	40	0	0	0	0	0	0	0	0
	point390	380	10	40	0	0	0	0	0	0	0	0
	point389	381	10	40	0	0	0	0	0	0	0	0
	point388	382	10	40	0	0	0	0	0	0	0	0
	point387	383	10	40	0	0	0	0	0	0	0	0
	point386	384	10	40	0	0	0	0	0	0	0	0
	point385	385	10	40	0	0	0	0	0	0	0	0
	point384	386	10	40	0	0	0	0	0	0	0	0

INPUT: TRAFFIC FOR LAeq1h Volumes

Yerba Buena Island 08080090.11

	point383	387	10	40	0	0	0	0	0	0	0	0	0	0	0
	point382	388													
Signal Rd - 2	point406	389	10	40	0	0	0	0	0	0	0	0	0	0	0
	point405	390	10	40	0	0	0	0	0	0	0	0	0	0	0
	point404	391	10	40	0	0	0	0	0	0	0	0	0	0	0
	point403	392	10	40	0	0	0	0	0	0	0	0	0	0	0
	point402	393	10	40	0	0	0	0	0	0	0	0	0	0	0
	point401	394	10	40	0	0	0	0	0	0	0	0	0	0	0
	point400	395	10	40	0	0	0	0	0	0	0	0	0	0	0
	point399	396	10	40	0	0	0	0	0	0	0	0	0	0	0
	point398	397	10	40	0	0	0	0	0	0	0	0	0	0	0
.	point397	398	10	40	0	0	0	0	0	0	0	0	0	0	0
	point396	399	10	40	0	0	0	0	0	0	0	0	0	0	0
	point395	400													
SFOBB WB - 3	point668	668	3075	105	41	105	51	88	0	0	0	0	0	0	0
	point667	667	3075	105	41	105	51	88	0	0	0	0	0	0	0
	point666	666	3075	105	41	105	51	88	0	0	0	0	0	0	0
	point626	626	3075	105	41	105	51	88	0	0	0	0	0	0	0
	point625	625	3075	105	41	105	51	88	0	0	0	0	0	0	0
	point624	624	3075	105	41	105	51	88	0	0	0	0	0	0	0
	point623	623	3075	105	41	105	51	88	0	0	0	0	0	0	0
	point622	622	3075	105	41	105	51	88	0	0	0	0	0	0	0
	point621	621	3075	105	41	105	51	88	0	0	0	0	0	0	0
	point620	620	3075	105	41	105	51	88	0	0	0	0	0	0	0
	point619	619	3075	105	41	105	51	88	0	0	0	0	0	0	0
	point618	618	3075	105	41	105	51	88	0	0	0	0	0	0	0
	point617	617	3075	105	41	105	51	88	0	0	0	0	0	0	0
	point616	616	3075	105	41	105	51	88	0	0	0	0	0	0	0
	point615	615	3075	105	41	105	51	88	0	0	0	0	0	0	0
	point614	614	3075	105	41	105	51	88	0	0	0	0	0	0	0
	point613	613													
SFOBB WB - 2	point664	664	3075	105	41	105	51	88	0	0	0	0	0	0	0
	point663	663	3075	105	41	105	51	88	0	0	0	0	0	0	0
	point662	662	3075	105	41	105	51	88	0	0	0	0	0	0	0
	point612	612	3075	105	41	105	51	88	0	0	0	0	0	0	0
	point611	611	3075	105	41	105	51	88	0	0	0	0	0	0	0

	point610	610	3075	105	41	105	51	88	0	0	0
	point609	609	3075	105	41	105	51	88	0	0	0
	point608	608	3075	105	41	105	51	88	0	0	0
	point607	607	3075	105	41	105	51	88	0	0	0
	point606	606	3075	105	41	105	51	88	0	0	0
	point605	605	3075	105	41	105	51	88	0	0	0
	point604	604	3075	105	41	105	51	88	0	0	0
	point603	603	3075	105	41	105	51	88	0	0	0
	point602	602	3075	105	41	105	51	88	0	0	0
	point601	601	3075	105	41	105	51	88	0	0	0
	point600	600	3075	105	41	105	51	88	0	0	0
	point599	599									
SFOBB WB - 1	point660	660	3075	105	41	105	51	88	0	0	0
	point659	659	3075	105	41	105	51	88	0	0	0
	point658	658	3075	105	41	105	51	88	0	0	0
	point596	596	3075	105	41	105	51	88	0	0	0
	point595	595	3075	105	41	105	51	88	0	0	0
	point594	594	3075	105	41	105	51	88	0	0	0
	point593	593	3075	105	41	105	51	88	0	0	0
	point592	592	3075	105	41	105	51	88	0	0	0
	point591	591	3075	105	41	105	51	88	0	0	0
	point590	590	3075	105	41	105	51	88	0	0	0
	point589	589	3075	105	41	105	51	88	0	0	0
	point588	588	3075	105	41	105	51	88	0	0	0
	point587	587	3075	105	41	105	51	88	0	0	0
	point586	586	3075	105	41	105	51	88	0	0	0
	point585	585	3075	105	41	105	51	88	0	0	0
	point584	584	3075	105	41	105	51	88	0	0	0
	point583	583									
SFOBB EB - 1	point636	636	2754	105	37	105	45	88	0	0	0
	point635	635	2754	105	37	105	45	88	0	0	0
	point634	634	2754	105	37	105	45	88	0	0	0
	point633	633	2754	105	37	105	45	88	0	0	0
	point632	632	2754	105	37	105	45	88	0	0	0
	point631	631	2754	105	37	105	45	88	0	0	0
	point630	630	2754	105	37	105	45	88	0	0	0



INPUT: TRAFFIC FOR LAeq1h Volumes

Yerba Buena Island 08080090.11

	point629	629	2754	105	37	105	45	88	0	0	0
	point628	628	2754	105	37	105	45	88	0	0	0
	point669	669	2754	105	37	105	45	88	0	0	0
	point670	670	2754	105	37	105	45	88	0	0	0
	point671	671	2754	105	37	105	45	88	0	0	0
	point672	672									
SFOBB EB - 2	point646	646	2754	105	37	105	45	88	0	0	0
	point645	645	2754	105	37	105	45	88	0	0	0
	point644	644	2754	105	37	105	45	88	0	0	0
	point643	643	2754	105	37	105	45	88	0	0	0
	point642	642	2754	105	37	105	45	88	0	0	0
	point641	641	2754	105	37	105	45	88	0	0	0
	point640	640	2754	105	37	105	45	88	0	0	0
	point639	639	2754	105	37	105	45	88	0	0	0
	point638	638	2754	105	37	105	45	88	0	0	0
	point673	673	2754	105	37	105	45	88	0	0	0
	point674	674	2754	105	37	105	45	88	0	0	0
	point675	675	2754	105	37	105	45	88	0	0	0
	point676	676									
SFOBB EB - 3	point656	656	2754	105	37	105	45	88	0	0	0
	point655	655	2754	105	37	105	45	88	0	0	0
	point654	654	2754	105	37	105	45	88	0	0	0
	point653	653	2754	105	37	105	45	88	0	0	0
	point652	652	2754	105	37	105	45	88	0	0	0
	point651	651	2754	105	37	105	45	88	0	0	0
	point650	650	2754	105	37	105	45	88	0	0	0
	point649	649	2754	105	37	105	45	88	0	0	0
	point648	648	2754	105	37	105	45	88	0	0	0
	point677	677	2754	105	37	105	45	88	0	0	0
	point678	678	2754	105	37	105	45	88	0	0	0
	point679	679	2754	105	37	105	45	88	0	0	0
	point680	680									
SFOBB WB OFF NE	point775	775	314	88	4	88	5	88	0	0	0
	point774	774	314	88	4	88	5	88	0	0	0
	point773	773	314	88	4	88	5	88	0	0	0
	point772	772	314	88	4	88	5	88	0	0	0

	point771	771	314	88	4	88	5	88	0	0	0	0
	point770	770	314	88	4	88	5	88	0	0	0	0
	point769	769	314	88	4	88	5	88	0	0	0	0
	point768	768	314	88	4	88	5	88	0	0	0	0
	point767	767	314	88	4	88	5	88	0	0	0	0
	point766	766	314	88	4	88	5	88	0	0	0	0
	point765	765	314	88	4	88	5	88	0	0	0	0
	point764	764										
SFOBB WB ON NE	point776	776	848	88	11	88	14	88	0	0	0	0
	point777	777	848	88	11	88	14	88	0	0	0	0
	point763	763	848	88	11	88	14	88	0	0	0	0
	point762	762	848	88	11	88	14	88	0	0	0	0
	point761	761	848	88	11	88	14	88	0	0	0	0
	point760	760	848	88	11	88	14	88	0	0	0	0
	point759	759	848	88	11	88	14	88	0	0	0	0
	point758	758	848	88	11	88	14	88	0	0	0	0
	point757	757	848	88	11	88	14	88	0	0	0	0
	point756	756	848	88	11	88	14	88	0	0	0	0
	point755	755	848	88	11	88	14	88	0	0	0	0
	point754	754	848	88	11	88	14	88	0	0	0	0
	point753	753	848	88	11	88	14	88	0	0	0	0
	point752	752	848	88	11	88	14	88	0	0	0	0
	point751	751	848	88	11	88	14	88	0	0	0	0
	point750	750	848	88	11	88	14	88	0	0	0	0
	point749	749	848	88	11	88	14	88	0	0	0	0
	point748	748	848	88	11	88	14	88	0	0	0	0
	point747	747	0	88	11	88	14	88	0	0	0	0
	point746	746	848	88	11	88	14	88	0	0	0	0
	point745	745	848	88	11	88	14	88	0	0	0	0
	point744	744	848	88	11	88	14	88	0	0	0	0
	point743	743	848	88	11	88	14	88	0	0	0	0
	point742	742	848	88	11	88	14	88	0	0	0	0
	point741	741	848	88	11	88	14	88	0	0	0	0
	point740	740	848	88	11	88	14	88	0	0	0	0
	point739	739	848	88	11	88	14	88	0	0	0	0
	point738	738	848	88	11	88	14	88	0	0	0	0

INPUT: TRAFFIC FOR LAeq1h Volumes

Yerba Buena Island 08080090.11

	point737	737	848	88	11	88	14	88	0	0	0
	point736	736	848	88	11	88	14	88	0	0	0
	point735	735	848	88	11	88	14	88	0	0	0
	point734	734	848	88	11	88	14	88	0	0	0
	point733	733	848	88	11	88	14	88	0	0	0
	point732	732	848	88	11	88	14	88	0	0	0
	point731	731	848	88	11	88	14	88	0	0	0
	point730	730	848	88	11	88	14	88	0	0	0
	point729	729	848	88	11	88	14	88	0	0	0
	point728	728	848	88	11	88	14	88	0	0	0
	point727	727	848	88	11	88	14	88	0	0	0
	point726	726	848	88	11	88	14	88	0	0	0
	point725	725	848	88	11	88	14	88	0	0	0
	point724	724									
North Gate Rd - 2	point779	779	340	40	7	40	3	40	0	0	0
	point242	208	340	40	7	40	3	40	0	0	0
	point241	209	340	40	7	40	3	40	0	0	0
	point240	210	340	40	7	40	3	40	0	0	0
	point239	211	340	40	7	40	3	40	0	0	0
	point238	212	340	40	7	40	3	40	0	0	0
	point237	213	340	40	7	40	3	40	0	0	0
	point236	214	340	40	7	40	3	40	0	0	0
	point235	215	340	40	7	40	3	40	0	0	0
	point234	216	340	40	7	40	3	40	0	0	0
	point233	217	340	40	7	40	3	40	0	0	0
	point232	218	340	40	7	40	3	40	0	0	0
	point231	219	340	40	7	40	3	40	0	0	0
	point230	220	340	40	7	40	3	40	0	0	0
	point229	221	340	40	7	40	3	40	0	0	0
	point228	222	340	40	7	40	3	40	0	0	0
	point227	223	340	40	7	40	3	40	0	0	0
	point226	224	340	40	7	40	3	40	0	0	0
	point225	225	340	40	7	40	3	40	0	0	0
	point224	226	340	40	7	40	3	40	0	0	0
	point223	227	340	40	7	40	3	40	0	0	0
	point222	228	340	40	7	40	3	40	0	0	0



point221	229	340	40	7	40	3	40	0	0	0
point220	230	340	40	7	40	3	40	0	0	0
point219	231	340	40	7	40	3	40	0	0	0
point218	232	340	40	7	40	3	40	0	0	0
point217	233	340	40	7	40	3	40	0	0	0
point216	234	340	40	7	40	3	40	0	0	0
point215	235	340	40	7	40	3	40	0	0	0
point214	236	340	40	7	40	3	40	0	0	0
point213	237	340	40	7	40	3	40	0	0	0
point212	238	340	40	7	40	3	40	0	0	0
point211	239	340	40	7	40	3	40	0	0	0
point210	240	340	40	7	40	3	40	0	0	0
point209	241	340	40	7	40	3	40	0	0	0
point208	242	340	40	7	40	3	40	0	0	0
point207	243	340	40	7	40	3	40	0	0	0
point206	244	340	40	7	40	3	40	0	0	0
point205	245	340	40	7	40	3	40	0	0	0
point204	246	340	40	7	40	3	40	0	0	0
point203	247	340	40	7	40	3	40	0	0	0
point202	248	340	40	7	40	3	40	0	0	0
point201	249	340	40	7	40	3	40	0	0	0
point200	250	340	40	7	40	3	40	0	0	0
point199	251	340	40	7	40	3	40	0	0	0
point198	252	340	40	7	40	3	40	0	0	0
point197	253	340	40	7	40	3	40	0	0	0
point196	254	340	40	7	40	3	40	0	0	0
point195	255	340	40	7	40	3	40	0	0	0
point194	256	340	40	7	40	3	40	0	0	0
point193	257	340	40	7	40	3	40	0	0	0
point192	258	340	40	7	40	3	40	0	0	0
point191	259	340	40	7	40	3	40	0	0	0
point190	260	340	40	7	40	3	40	0	0	0
point189	261	340	40	7	40	3	40	0	0	0
point188	262									
Macalla - 2	781	340	40	7	40	3	40	0	0	0
point262	782	340	40	7	40	3	40	0	0	0

INPUT: TRAFFIC FOR LAeq1h Volumes

Yerba Buena Island 08080090.11

point261	783	340	40	7	40	3	40	0	0	0
point260	784	340	40	7	40	3	40	0	0	0
point259	785	340	40	7	40	3	40	0	0	0
point258	786	340	40	7	40	3	40	0	0	0
point257	787	340	40	7	40	3	40	0	0	0
point256	788	340	40	7	40	3	40	0	0	0
point255	789	340	40	7	40	3	40	0	0	0
point254	790	340	40	7	40	3	40	0	0	0
point253	791	340	40	7	40	3	40	0	0	0
point252	792	340	40	7	40	3	40	0	0	0
point251	793	340	40	7	40	3	40	0	0	0
point250	794	340	40	7	40	3	40	0	0	0
point249	795	340	40	7	40	3	40	0	0	0
point248	796	340	40	7	40	3	40	0	0	0
point247	797	340	40	7	40	3	40	0	0	0
point246	798	340	40	7	40	3	40	0	0	0
point245	799	340	40	7	40	3	40	0	0	0
point244	800	340	40	7	40	3	40	0	0	0
point243	801									

INPUT: RECEIVERS

Yerba Buena Island 08080090.11

EDAW/AECOM  
Maddux B.

20 October 2009  
TNM 2.5

INPUT: RECEIVERS

PROJECT/CONTRACT:  
RUN:

Yerba Buena Island 08080090.11  
Future Alternative 4

Receiver		Coordinates (ground)				Height above Ground	Input Sound Levels and Criteria				Active in Calc.
Name	No.	#DUs	X	Y	Z		Existing LAeq1h	Impact Criteria LAeq1h	Sub'l	NR Goal	
			m	m	m	m	dBA	dBA	dB	dB	
R-1		9	1	916.0	782.7	28.00	1.50	67.40	71	12.0	5.0
R-2 (ST-1)		16	1	989.0	755.0	21.00	1.50	71.40	71	12.0	5.0
R-3		17	1	855.5	618.7	64.00	1.50	71.40	66	12.0	5.0
R-4 (ST-3)		18	1	1,163.1	658.2	2.80	1.50	71.40	71	12.0	5.0
R-5		19	1	1,125.6	585.5	2.80	1.50	70.40	71	12.0	5.0
R-6		20	1	1,132.2	636.9	2.70	1.50	0.00	66	12.0	5.0
R-7		21	1	1,103.1	625.7	2.80	1.50	0.00	66	12.0	5.0
R-8		22	1	1,095.9	589.2	2.80	1.50	0.00	66	12.0	5.0
R-9		24	1	1,104.5	546.9	3.10	1.50	0.00	66	12.0	5.0
R-10 (ST-2)		25	1	1,111.1	505.2	3.70	1.50	65.90	66	12.0	5.0
R-11		38	1	1,020.4	431.5	46.00	1.50	0.00	66	12.0	5.0
R-12 (ST-4)		39	1	1,022.0	456.0	45.00	1.50	63.50	66	12.0	5.0
R-13 (ST-5)		40	1	1,021.2	379.7	45.00	1.50	60.90	71	12.0	5.0
R-14		41	1	1,018.4	397.2	51.80	1.50	0.00	66	12.0	5.0
R-15		42	1	1,020.0	357.1	52.20	1.50	0.00	66	12.0	5.0
R-16		43	1	794.8	434.3	101.50	1.50	73.10	71	12.0	5.0
R-17		54	1	719.3	596.8	66.70	1.50	0.00	66	12.0	5.0
R-1 0											
R-2 (ST-1) 0											
R-3 0											
R-4 (ST-3) 0											
R-5 0											



**Yerba Buena Island 08080090.11**

R-6	0
R-7	0
R-8	0
R-9	0
R-10 (ST-2)	0
R-11	1
R-12 (ST-4)	0
R-13 (ST-5)	0
R-14	0
R-15	0
R-16	0

INPUT: BARRIERS  
PROJECT/CONTRACT:  
RUN:

13 August 2009  
TNM 2.5

[illegible]

										point36	36	703.0	418.2	92.00	6.00	0.00	0	0
										point37	37	704.2	419.9	92.00	6.00	0.00	0	0
										point38	38	687.4	431.4	92.00	6.00	0.00	0	0
										point39	39	686.3	429.8	92.00	6.00	0.00	0	0
										point40	40	685.0	430.7	92.00	6.00	0.00	0	0
										point41	41	680.1	423.5	92.00	6.00			
Barrier4	W	0.00	30.48	0.00					0.00	point42	42	662.2	446.1	92.00	6.00	0.00	0	0
										point43	43	666.2	440.5	92.00	6.00	0.00	0	0
										point44	44	667.5	441.4	92.00	6.00	0.00	0	0
										point45	45	673.2	433.5	92.00	6.00	0.00	0	0
										point46	46	672.0	432.6	92.00	6.00	0.00	0	0
										point47	47	676.1	427.3	92.00	6.00	0.00	0	0
										point48	48	683.0	432.2	92.00	6.00	0.00	0	0
										point49	49	682.0	433.4	92.00	6.00	0.00	0	0
										point50	50	683.6	434.6	92.00	6.00	0.00	0	0
										point51	51	671.7	451.1	92.00	6.00	0.00	0	0
										point52	52	670.2	448.9	92.00	6.00	0.00	0	0
										point53	53	669.3	451.2	92.00	6.00	0.00	0	0
										point54	54	662.2	446.1	92.00	6.00	0.00	0	0
Barrier5	W	0.00	30.48	0.00					0.00	point55	55	621.3	443.4	86.00	6.00	0.00	0	0
										point56	56	629.0	439.2	86.00	6.00	0.00	0	0
										point57	57	628.4	438.0	86.00	6.00	0.00	0	0
										point58	58	632.9	435.5	86.00	6.00	0.00	0	0
										point59	59	633.8	437.2	86.00	6.00	0.00	0	0
										point60	60	641.4	433.0	86.00	6.00	0.00	0	0
										point61	61	644.4	438.4	86.00	6.00	0.00	0	0
										point62	62	642.8	439.3	86.00	6.00	0.00	0	0
										point63	63	644.5	442.4	86.00	6.00	0.00	0	0
										point64	64	639.2	445.2	86.00	6.00	0.00	0	0
										point65	65	639.7	446.1	86.00	6.00	0.00	0	0
										point66	66	633.5	449.5	86.00	6.00	0.00	0	0
										point67	67	632.8	448.2	86.00	6.00	0.00	0	0
										point68	68	627.3	451.2	86.00	6.00	0.00	0	0
										point69	69	625.5	448.0	86.00	6.00	0.00	0	0
										point70	70	624.1	448.7	86.00	6.00	0.00	0	0
										point71	71	621.3	443.4	86.00	6.00			
Barrier6	W	0.00	30.48	0.00					0.00	point72	72	645.1	431.4	86.00	6.00	0.00	0	0
										point73	73	650.5	424.6	86.00	6.00	0.00	0	0
										point74	74	649.2	423.6	86.00	6.00	0.00	0	0
										point75	75	652.4	419.6	86.00	6.00	0.00	0	0
										point76	76	653.6	420.6	86.00	6.00	0.00	0	0
										point77	77	659.0	413.7	86.00	6.00	0.00	0	0
										point78	78	663.7	417.4	86.00	6.00	0.00	0	0
										point79	79	662.8	418.6	86.00	6.00	0.00	0	0
										point80	80	665.5	420.8	86.00	6.00	0.00	0	0
										point81	81	661.8	425.5	86.00	6.00	0.00	0	0
										point82	82	663.0	426.4	86.00	6.00	0.00	0	0
										point83	83	658.5	432.1	86.00	6.00	0.00	0	0
										point84	84	658.0	431.7	86.00	6.00	0.00	0	0





## INPUT: BARRIERS

Yerba Buena Island 08080090.11

										point193	193	853.8	586.7	66.50	4.50	0.00	0	0
										point194	194	854.9	600.3	66.50	4.50	0.00	0	0
										point197	197	832.9	601.5	66.50	4.50			
Barrier13									0.00	point198	198	802.3	633.6	66.50	4.50	0.00	0	0
										point199	199	805.0	625.0	66.50	4.50	0.00	0	0
										point200	200	828.8	631.6	66.50	4.50	0.00	0	0
										point201	201	832.6	618.0	66.50	4.50	0.00	0	0
										point202	202	797.9	608.3	66.50	4.50	0.00	0	0
										point203	203	800.3	599.2	66.50	4.50	0.00	0	0
										point206	206	844.6	611.7	66.50	4.50	0.00	0	0
										point207	207	839.4	630.6	66.50	4.50	0.00	0	0
										point208	208	833.6	629.0	66.50	4.50	0.00	0	0
										point209	209	830.1	641.6	66.50	4.50	0.00	0	0
										point210	210	826.8	640.7	66.50	4.50	0.00	0	0
										point211	211	826.7	641.1	66.50	4.50	0.00	0	0
										point212	212	802.3	633.6	66.50	4.50			
Barrier14									0.00	point213	213	919.3	602.1	49.50	5.00	0.00	0	0
										point214	214	901.4	618.0	49.50	5.00	0.00	0	0
										point215	215	920.2	639.5	49.50	5.00	0.00	0	0
										point216	216	929.2	631.7	49.50	5.00	0.00	0	0
										point217	217	916.7	617.4	49.50	5.00	0.00	0	0
										point218	218	925.8	609.3	49.50	5.00	0.00	0	0
										point219	219	919.3	602.1	49.50	5.00			
Barrier15									0.00	point220	220	980.4	298.2	56.50	4.00	0.00	0	0
										point221	221	990.4	296.2	56.50	4.00	0.00	0	0
										point222	222	991.8	303.3	56.50	4.00	0.00	0	0
										point223	223	981.8	305.3	56.50	4.00	0.00	0	0
										point224	224	980.4	298.2	56.50	4.00			
Barrier16									0.00	point226	226	1,006.8	351.3	52.50	4.50	0.00	0	0
										point227	227	1,017.7	351.4	52.50	4.50	0.00	0	0
										point228	228	1,017.7	352.4	52.50	4.50	0.00	0	0
										point229	229	1,018.7	352.4	52.50	4.50	0.00	0	0
										point230	230	1,018.6	355.2	52.50	4.50	0.00	0	0
										point231	231	1,017.5	355.2	52.50	4.50	0.00	0	0
										point232	232	1,017.5	356.0	52.50	4.50	0.00	0	0
										point233	233	1,015.4	356.0	52.50	4.50	0.00	0	0
										point234	234	1,015.4	356.3	52.50	4.50	0.00	0	0
										point235	235	1,015.2	357.0	52.50	4.50	0.00	0	0
										point236	236	1,017.3	357.0	52.50	4.50	0.00	0	0
										point237	237	1,017.2	367.3	52.50	4.50	0.00	0	0
										point238	238	1,011.5	367.4	52.50	4.50	0.00	0	0
										point239	239	1,011.4	365.4	52.50	4.50	0.00	0	0
										point240	240	1,007.0	365.5	52.50	4.50	0.00	0	0
										point241	241	1,006.9	364.2	52.50	4.50	0.00	0	0
										point242	242	1,006.8	364.2	52.50	4.50	0.00	0	0
										point243	243	1,006.8	351.3	52.50	4.50	0.00	0	0
Barrier17									0.00	point244	244	1,006.5	403.5	51.75	4.50	0.00	0	0
										point245	245	1,006.8	391.4	51.75	4.50	0.00	0	0
										point246	246	1,017.4	391.7	51.75	4.50	0.00	0	0







point296	296	1,120.9	629.7	3.50	5.00	0.00	0	0
point297	297	1,120.9	627.1	3.50	5.00	0.00	0	0
point298	298	1,115.5	626.9	3.50	5.00	0.00	0	0
point299	299	1,115.2	628.6	3.50	5.00	0.00	0	0
point300	300	1,108.0	628.2	3.50	5.00	0.00	0	0
point301	301	1,100.1	619.6	3.50	5.00	0.00	0	0
point302	302	1,102.4	613.9	3.50	5.00	0.00	0	0
point303	303	1,103.2	607.7	3.50	5.00	0.00	0	0
point304	304	1,099.9	603.6	3.50	5.00	0.00	0	0
point305	305	1,097.1	603.3	3.50	5.00	0.00	0	0
point306	306	1,097.7	589.6	3.50	5.00	0.00	0	0
point307	307	1,102.6	589.9	3.50	5.00	0.00	0	0
point308	308	1,102.6	588.5	3.50	5.00	0.00	0	0
point309	309	1,099.2	588.3	3.50	5.00	0.00	0	0
point310	310	1,099.9	572.5	3.50	5.00	0.00	0	0
point311	311	1,104.7	572.8	3.50	5.00	0.00	0	0
point312	312	1,104.8	569.0	3.50	5.00	0.00	0	0
point313	313	1,098.6	568.8	3.50	5.00	0.00	0	0
point314	314	1,098.7	563.4	3.50	5.00	0.00	0	0
point315	315	1,100.3	562.0	3.50	5.00	0.00	0	0
point316	316	1,100.6	554.8	3.50	5.00	0.00	0	0
point317	317	1,112.7	543.6	3.50	5.00	0.00	0	0
point318	318	1,123.7	544.2	3.50	5.00	0.00	0	0
point319	319	1,123.8	546.2	3.50	5.00	0.00	0	0
point320	320	1,124.8	546.2	3.50	5.00	0.00	0	0
point321	321	1,124.8	544.4	3.50	5.00	0.00	0	0
point322	322	1,127.8	544.4	3.50	5.00	0.00	0	0
point323	323	1,127.9	547.3	3.50	5.00	0.00	0	0
point324	324	1,142.8	548.1	3.50	5.00	0.00	0	0
point325	325	1,146.7	544.4	3.50	5.00	0.00	0	0
point326	326	1,148.7	544.5	3.50	5.00	0.00	0	0
point327	327	1,148.8	543.2	3.50	5.00	0.00	0	0
point328	328	1,146.9	543.2	3.50	5.00	0.00	0	0
point329	329	1,147.5	521.6	3.50	5.00	0.00	0	0
point330	330	1,149.7	521.6	3.50	5.00	0.00	0	0
point331	331	1,149.8	520.0	3.50	5.00	0.00	0	0
point332	332	1,146.6	520.0	3.50	5.00	0.00	0	0
point333	333	1,146.9	509.3	3.50	5.00	0.00	0	0
point334	334	1,153.2	509.3	3.50	5.00	0.00	0	0
point335	335	1,153.2	499.4	3.50	5.00	0.00	0	0
point336	336	1,149.4	495.2	3.50	5.00	0.00	0	0
point337	337	1,142.6	495.0	3.50	5.00	0.00	0	0
point338	338	1,142.6	496.3	3.50	5.00	0.00	0	0
point339	339	1,131.7	496.3	3.50	5.00	0.00	0	0
point340	340	1,131.9	490.0	3.50	5.00	0.00	0	0
point341	341	1,143.3	490.0	3.50	5.00	0.00	0	0
point342	342	1,143.3	491.5	3.50	5.00	0.00	0	0
point343	343	1,146.9	491.7	3.50	5.00	0.00	0	0
point344	344	1,146.9	487.6	3.50	5.00	0.00	0	0



**Yerba Buena Island 08080090.11**

C:\TNM\YB\NewSetBM0709\Alt4BM\A4080609





**Yerba Buena Island 08080090.11**

C:\TNM\YB\NewSetBM0709\Alt4BM\A4080609

INPUT: TERRAIN LINES

EDAW/AECOM

Maddux B.

13 August 2009

TNM 2.5

INPUT: TERRAIN LINES

PROJECT/CONTRACT:

RUN:

Yerba Buena Island 08080090.11

Future Alternative 4

Terrain Line Name	Points			
	No.	Coordinates (ground)		
		X	Y	Z
		m	m	m
Terrain Line7	65	711.3	722.8	0.50
	66	708.4	693.7	10.00
	67	702.2	671.8	20.00
	68	697.4	656.0	30.00
	69	697.0	643.4	40.00
	70	698.4	633.3	50.00
	71	701.3	623.5	60.00
	72	701.6	614.8	66.50
Terrain Line8	73	693.8	610.9	67.00
	74	775.9	636.9	66.00
	75	776.0	652.2	60.00
	76	760.7	664.5	50.00
	77	749.2	666.9	40.00
	78	745.1	679.7	32.00
	79	741.0	692.2	20.00
	80	736.4	708.9	10.00
Terrain Line9	81	728.9	726.6	0.50
	82	793.5	779.6	0.50
Terrain Line10	83	804.9	734.8	30.00
	84	891.8	737.7	26.50
	85	880.2	742.8	25.00
	86	857.1	753.1	24.00
	87	849.0	763.4	14.00
	88	835.4	783.9	4.00



INPUT: TERRAIN LINES

Yerba Buena Island 08080090.11

	89	835.0	795.2	0.50
Terrain Line11	90	855.1	809.6	0.50
	91	871.4	775.5	24.50
Terrain Line12	92	860.0	843.5	0.50
	93	880.1	821.7	20.00
Terrain Line13	94	882.2	862.6	0.50
	95	902.1	845.4	18.00
Terrain Line14	96	919.8	882.0	0.50
	97	927.1	861.2	16.00
Terrain Line15	98	940.8	864.0	16.00
	99	946.0	867.4	14.00
	100	949.1	881.7	8.00
	101	945.2	890.5	4.00
	102	937.9	894.6	0.50
Terrain Line16	103	968.5	886.1	0.50
	104	962.0	868.2	15.00
Terrain Line17	105	1,029.6	900.0	0.50
	106	1,031.9	878.5	12.00
Terrain Line18	107	1,109.0	899.0	0.50
	108	1,110.1	877.1	9.50
Terrain Line19	109	927.7	853.3	18.00
	110	926.5	838.9	24.00
	111	926.7	832.6	25.50
Terrain Line20	112	959.6	860.0	15.50
	113	949.0	832.9	24.50
Terrain Line21	114	886.1	821.0	22.00
	115	888.6	814.3	24.00
	116	891.7	812.4	25.00
	117	898.1	806.1	26.00
Terrain Line22	118	880.7	778.3	26.00
	119	888.4	777.8	26.50
	120	889.8	777.7	27.50
	121	899.3	778.8	28.00
	122	912.4	784.1	29.00
Terrain Line23	123	900.8	756.4	26.00
	124	903.3	772.2	28.00

## INPUT: TERRAIN LINES

Yerba Buena Island 08080090.11

	125	913.2	783.0	29.00
Terrain Line24	126	915.3	796.2	26.00
	127	909.5	798.3	26.50
Terrain Line25	128	923.4	816.5	25.50
	129	923.6	813.4	27.00
	130	920.9	806.0	28.50
Terrain Line26	131	942.4	802.0	23.50
	132	935.6	803.3	26.50
	133	924.8	803.3	29.00
Terrain Line27	134	956.2	754.4	22.50
	135	948.0	764.3	23.50
	136	920.0	791.6	28.50
Terrain Line28	137	948.3	789.6	22.50
	138	942.9	787.8	26.00
Terrain Line29	139	954.5	822.7	24.50
	140	968.2	849.7	18.00
	141	985.8	861.3	13.50
	142	999.7	860.6	12.00
	143	1,026.4	859.3	11.00
	144	1,055.7	857.9	10.00
	145	1,071.0	858.7	9.50
Terrain Line31	146	1,027.1	836.6	11.50
	147	1,027.0	825.3	12.30
	148	1,025.8	810.2	11.50
Terrain Line32	149	1,054.2	841.3	11.50
	150	1,048.9	825.2	14.50
	151	1,050.8	811.9	12.00
	152	1,057.4	801.8	13.50
	153	1,063.4	797.9	11.50
Terrain Line33	154	932.1	688.7	39.00
	155	956.4	742.7	21.50
	156	990.1	750.3	20.50
	157	1,026.9	772.0	12.50
	158	1,050.9	792.9	11.50
	159	1,057.4	801.8	13.50
	160	1,064.4	802.2	12.00

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INPUT: TERRAIN LINES

Yerba Buena Island 08080090.11

Terrain Line34	162	966.2	674.6	40.00
	163	983.7	710.3	21.00
	164	1,004.9	721.9	20.00
	165	1,019.3	727.2	18.00
Terrain Line35	167	1,017.7	792.0	12.50
	168	996.2	786.0	18.50
	169	987.8	784.8	19.50
	170	979.8	783.7	20.50
	171	975.4	779.9	21.00
Terrain Line36	172	856.1	611.5	65.00
	173	895.4	623.0	57.50
	174	914.7	642.0	54.00
	175	922.7	641.4	52.00
	176	931.7	640.2	50.00
	177	943.2	632.3	48.00
Terrain Line37	178	886.6	610.1	58.00
	179	901.9	613.2	55.00
Terrain Line38	180	859.1	594.6	64.00
	181	875.4	593.9	60.00
	182	887.3	593.4	58.50
	183	901.8	591.4	56.00
Terrain Line39	184	783.7	476.6	87.00
	185	782.5	486.0	86.00
	186	790.7	502.0	82.00
	187	813.2	518.4	74.00
	188	820.2	527.2	70.00
	189	868.0	552.1	61.50
	190	885.8	570.3	58.70
	191	902.3	588.3	56.00
	192	914.6	597.3	54.00
Terrain Line44	209	1,123.2	905.6	0.50
	210	1,139.2	892.5	14.00
Terrain Line46	214	793.0	430.2	103.00
	215	809.1	428.4	100.00
	216	827.3	439.8	89.00
	217	830.3	442.6	89.00



	218	838.8	456.3	72.00
	219	841.2	459.3	70.00
	220	838.5	469.1	69.00
Terrain Line47	221	782.1	440.8	103.50
	222	783.7	442.4	102.00
	223	797.3	470.1	88.00
	224	797.5	475.2	88.00
	225	804.3	488.2	80.00
	226	817.6	492.0	73.00
	227	829.5	495.4	66.00
	228	846.2	497.2	56.00
Terrain Line49	229	730.1	434.6	103.50
	230	708.8	445.6	100.00
	231	690.7	458.1	96.00
	232	674.2	481.7	90.00
	233	672.0	486.3	88.00
Terrain Line60	283	810.9	312.7	64.00
	284	809.0	344.2	83.00
	285	809.5	347.6	83.00
	286	807.3	368.4	91.00
	287	807.8	373.3	92.00
	288	810.8	387.2	96.00
	289	812.9	395.1	100.00
	290	810.2	400.2	100.50
	291	808.0	415.5	101.00
Terrain Line61	292	842.9	392.4	100.00
	293	927.1	293.8	64.00
Terrain Line62	294	840.9	400.5	100.00
	295	892.0	398.3	88.00
	296	910.4	418.5	78.00
	297	921.7	445.7	68.00
	298	914.4	475.3	57.00
Terrain Line63	299	840.9	400.5	100.00
	300	862.6	407.0	94.00
	301	868.2	413.8	88.60
	302	869.7	417.8	83.30

INPUT: TERRAIN LINES

Yerba Buena Island 08080090.11

	303	871.2	429.8	78.00
	304	867.6	448.9	69.00
	305	867.2	458.6	60.00
	306	857.5	463.5	56.00
Terrain Line64	307	704.4	355.8	74.00
	308	720.8	337.9	45.00
Terrain Line65	309	704.8	353.7	73.00
	310	691.7	331.7	35.00
	311	642.7	268.9	28.00
	312	605.9	215.3	1.00
Terrain Line67	320	736.6	323.7	45.00
	321	764.3	305.5	63.50
Terrain Line68	322	637.9	185.4	28.00
	323	686.6	239.3	35.00
	324	725.5	278.7	50.00
	325	762.6	303.1	63.50
Terrain Line72	335	1,144.3	937.4	0.50
	336	1,156.6	911.2	16.00
Terrain Line91	396	1,381.1	887.8	2.50
	397	1,388.2	888.0	0.50
Terrain Line92	398	1,255.4	835.2	4.80
	399	1,275.9	841.3	4.00
	400	1,302.6	857.7	21.50
	401	1,310.6	860.4	21.60
	402	1,319.0	863.7	21.80
	403	1,326.4	866.5	22.00
	404	1,342.1	870.6	8.00
	405	1,350.6	876.0	6.00
	406	1,359.8	876.3	3.50
Terrain Line93	407	1,374.2	884.6	3.50
	408	1,381.9	877.2	0.50
Terrain Line94	409	1,375.4	878.4	0.50
	410	1,370.7	880.7	3.50
Terrain Line95	411	1,367.1	875.0	3.50
	412	1,369.1	869.7	0.50
Terrain Line96	413	1,365.4	864.5	0.50

## INPUT: TERRAIN LINES

Yerba Buena Island 08080090.11

	414	1,361.8	867.1	3.00
Terrain Line97	415	1,359.7	853.1	0.50
	416	1,357.2	857.0	3.00
Terrain Line98	417	1,326.7	861.5	22.00
	418	1,336.5	858.0	6.00
	419	1,344.5	855.0	3.50
Terrain Line101	420	1,361.6	847.0	0.50
	421	1,353.4	848.2	3.00
Terrain Line104	520	1,229.0	777.5	2.80
	521	1,213.2	761.4	4.50
	522	1,205.9	754.1	2.50
Terrain Line105	523	1,215.0	782.3	3.00
	524	1,205.8	777.1	5.50
Terrain Line106	525	1,180.2	792.7	7.00
	526	1,189.0	800.8	4.00
	527	1,194.2	799.2	3.50
Terrain Line107	528	1,194.9	244.3	0.50
	529	1,185.4	457.2	0.50
	530	1,235.9	464.7	0.50
	531	1,266.6	541.5	0.50
	532	1,257.8	544.8	0.50
	533	1,229.2	473.2	0.50
	534	1,227.5	473.0	0.50
	535	1,199.6	469.0	0.50
	536	1,180.9	466.2	0.50
	537	1,180.3	469.1	0.50
	538	1,174.9	498.9	0.50
	539	1,173.2	509.1	0.50
	540	1,173.2	512.1	0.50
	541	1,172.0	518.2	0.50
	542	1,171.9	521.6	0.50
	543	1,171.4	525.3	0.50
	544	1,171.3	529.7	0.50
	545	1,172.5	531.1	0.50
	546	1,172.3	533.2	0.50
	547	1,172.1	539.1	0.50



## INPUT: TERRAIN LINES

Yerba Buena Island 08080090.11

	548	1,171.6	541.1	0.50
	549	1,172.0	544.4	0.50
	550	1,173.2	555.6	0.50
	551	1,174.5	564.4	0.50
	552	1,175.3	573.2	0.50
	553	1,179.6	585.3	0.50
	554	1,183.1	596.3	0.50
	555	1,187.5	611.4	0.50
	556	1,187.8	614.8	0.50
	557	1,189.4	622.0	0.50
	558	1,189.8	623.7	0.50
	559	1,188.6	625.3	0.50
	560	1,188.8	627.1	0.50
	561	1,189.2	630.8	0.50
	562	1,190.0	632.5	0.50
	563	1,190.4	636.0	0.50
	564	1,190.3	639.4	0.50
	565	1,190.7	642.2	0.50
	566	1,191.1	647.4	0.50
	567	1,191.1	650.2	0.50
	568	1,191.0	654.0	0.50
	569	1,190.9	659.3	0.50
	570	1,191.1	662.8	0.50
	571	1,191.1	666.6	0.50
	572	1,190.2	668.1	0.50
	573	1,190.2	672.3	0.50
	574	1,190.4	679.4	0.50
	575	1,190.5	682.7	0.50
	576	1,190.9	685.9	0.50
	577	1,191.2	690.0	0.50
	578	1,191.4	692.6	0.50
	579	1,191.9	695.6	0.50
	580	1,192.7	700.8	0.50
	581	1,194.1	706.5	0.50
	582	1,195.5	712.2	0.50
	583	1,196.9	715.2	0.50

	584	1,197.2	717.2	0.50
	585	1,197.8	718.6	0.50
	586	1,200.2	720.8	0.50
	587	1,203.2	727.2	0.50
	588	1,204.1	729.8	0.50
	589	1,212.5	738.1	0.50
	590	1,221.0	746.1	0.50
	591	1,227.9	752.4	0.50
	592	1,233.7	756.7	0.50
	593	1,244.8	764.6	0.50
	594	1,255.9	773.7	0.50
	595	1,258.1	775.0	0.50
	596	1,268.6	782.8	0.50
	597	1,280.0	790.9	0.50
	598	1,290.3	796.6	0.50
	599	1,303.1	804.8	0.50
	600	1,318.1	815.1	0.50
	601	1,324.4	818.4	0.50
	602	1,326.2	819.1	0.50
	603	1,327.8	819.2	0.50
	604	1,328.8	820.6	0.50
	605	1,330.4	820.3	0.50
	606	1,331.8	820.1	0.50
	607	1,332.5	818.7	0.50
	608	1,333.9	817.7	0.50
	609	1,335.2	818.5	0.50
	610	1,336.7	816.7	0.50
	611	1,337.6	815.9	0.50
	612	1,338.2	817.1	0.50
	613	1,337.6	818.8	0.50
	614	1,338.6	820.7	0.50
	615	1,341.8	822.5	0.50
	616	1,344.5	824.8	0.50
	617	1,349.8	825.0	0.50
	618	1,354.6	825.1	0.50
	619	1,358.7	826.3	0.50

INPUT: TERRAIN LINES

	620	1,359.3	825.9	0.50
	621	1,365.3	836.6	0.50
	622	1,364.1	838.4	0.50
	623	1,362.9	840.3	0.50
	624	1,363.1	841.5	0.50
	625	1,360.5	844.2	0.50
Terrain Line109	629	1,163.8	737.6	3.50
	630	1,166.1	743.2	4.00
	631	1,167.8	756.3	7.00
Terrain Line112	643	1,105.0	721.6	3.50
	644	1,103.1	731.0	8.00
Terrain Line115	656	1,057.4	641.7	7.00
	657	1,068.2	649.1	6.50
	658	1,078.2	648.0	3.50
	659	1,082.0	647.3	3.00
Terrain Line116	660	1,071.2	619.8	3.00
	661	1,063.3	619.9	6.50
Terrain Line117	662	1,061.5	576.9	6.00
	663	1,064.6	593.9	6.00
	664	1,067.4	607.7	6.00
	665	1,070.8	617.6	6.00
Terrain Line118	668	999.8	555.6	46.00
	669	1,023.7	579.9	20.00
	670	1,038.7	588.3	10.00
	671	1,046.4	597.4	6.50
	672	1,062.2	594.6	6.00
Terrain Line119	673	1,007.5	504.4	47.50
	674	1,010.6	494.7	44.00
	675	1,014.9	493.3	43.50
	676	1,023.2	496.8	43.00
	677	1,069.9	515.7	10.00
	678	1,074.4	517.6	5.50
Terrain Line120	679	992.9	400.8	58.00
	680	1,006.1	412.7	50.00
	681	1,015.3	422.6	48.00
	682	1,023.7	431.6	46.00



## INPUT: TERRAIN LINES

Yerba Buena Island 08080090.11

	683	1,058.4	447.9	32.00
	684	1,083.4	468.6	10.00
	685	1,096.7	481.6	4.50
Terrain Line121	687	1,022.2	407.4	50.00
	688	1,055.4	413.0	40.00
	689	1,100.5	418.5	30.00
	690	1,136.9	455.0	3.50
Terrain Line122	691	1,028.9	370.3	48.00
	692	1,022.0	367.3	52.00
Terrain Line123	693	1,022.3	356.0	52.00
	694	1,030.1	356.4	48.00
	695	1,045.4	357.6	44.00
	696	1,111.6	368.9	30.00
	697	1,139.3	352.0	3.50
Terrain Line124	698	931.8	287.3	63.00
	699	939.6	267.2	52.00
Terrain Line125	700	623.1	170.0	0.50
	701	655.3	163.2	0.50
	702	675.3	159.5	0.50
	703	720.1	166.3	0.50
	704	767.8	185.0	0.50
	705	817.2	188.4	0.50
	706	841.6	182.2	0.50
	707	858.7	164.0	0.50
	708	870.5	170.5	0.50
	709	933.0	169.7	0.50
	710	1,000.2	168.9	0.50
	711	1,029.7	161.6	0.50
	712	1,045.0	146.3	0.50
	713	1,064.6	126.7	0.50
	714	1,089.9	124.5	0.50
	715	1,113.2	129.6	0.50
	716	1,123.2	150.0	0.50
	717	1,133.4	182.6	0.50
	718	1,147.6	197.2	0.50
	719	1,158.0	201.2	0.50

INPUT: TERRAIN LINES

	720	1,157.6	215.4	0.50
	721	1,182.2	241.8	0.50
Terrain Line126	722	873.5	285.5	60.00
	723	852.1	231.5	43.50
Terrain Line127	724	774.2	202.5	32.00
	725	771.7	229.2	39.00
	726	773.0	258.5	45.50
	727	783.0	281.8	50.00
	728	789.5	299.9	62.00
Terrain Line128	729	731.2	322.8	62.00
	730	585.5	155.4	62.00
	731	573.6	173.9	62.00
	732	714.3	330.2	62.00
Terrain Line129	733	731.8	322.4	45.00
	734	585.4	154.2	45.00
	735	572.8	174.0	45.00
	736	713.8	330.7	45.00
Terrain Line99-Terrain Line100	749	1,316.3	855.7	22.00
	750	1,317.0	850.3	12.00
	751	1,318.4	839.6	3.50
Terrain Line40	752	735.6	450.1	103.50
	753	732.8	482.9	90.00
	754	747.1	487.5	86.50
	755	749.9	491.1	86.50
	756	750.6	493.1	86.50
	757	764.3	531.7	78.50
	758	759.0	550.4	75.50
	759	770.9	561.9	75.50
	760	769.7	567.1	74.00
	761	779.4	574.5	70.00
	762	790.9	603.2	68.00
Terrain Line30	763	1,079.1	831.3	11.00
	764	1,073.5	831.0	12.50
	765	1,060.1	827.9	13.50
	766	1,048.9	825.2	14.50
	767	1,039.4	825.3	13.50

## INPUT: TERRAIN LINES

Yerba Buena Island 08080090.11

	768	1,027.0	825.3	12.30
	769	1,014.9	823.9	11.80
	770	1,001.2	822.3	11.00
Terrain Line136	771	1,194.0	244.3	3.00
	772	1,184.9	457.6	3.00
	773	1,235.6	465.2	3.00
	774	1,266.0	541.2	3.00
	775	1,258.1	544.2	3.00
	776	1,229.6	472.7	3.00
	777	1,227.5	472.5	3.00
	778	1,199.7	468.5	3.00
	779	1,180.5	465.6	3.00
	780	1,179.8	469.0	3.00
	781	1,174.4	498.8	3.00
	782	1,172.7	509.1	3.00
	783	1,170.0	515.1	3.00
	784	1,169.7	519.3	3.00
	785	1,169.5	522.3	3.00
	786	1,168.3	525.4	3.00
	787	1,167.7	530.6	3.00
	788	1,167.4	534.2	3.00
	789	1,167.7	537.6	3.00
	790	1,168.1	540.8	3.00
	791	1,168.3	543.9	3.00
	792	1,167.8	546.3	3.00
	793	1,168.9	554.7	3.00
	794	1,170.9	566.0	3.00
	795	1,171.4	572.0	3.00
	796	1,173.6	580.4	3.00
	797	1,177.0	592.0	3.00
	798	1,181.4	606.3	3.00
	799	1,183.0	615.2	3.00
	800	1,183.4	622.6	3.00
	801	1,183.2	631.3	3.00
	802	1,183.4	633.6	3.00
	803	1,182.4	643.8	3.00



## INPUT: TERRAIN LINES

Yerba Buena Island 08080090.11

	804	1,183.0	646.5	3.00
	805	1,183.1	647.2	3.00
	806	1,184.0	655.7	3.00
	807	1,184.1	658.5	3.00
	809	1,184.2	660.1	3.00
	810	1,184.2	662.9	3.00
	811	1,184.1	666.7	3.00
	812	1,184.0	672.0	3.00
	813	1,184.2	675.5	3.00
	814	1,184.2	679.2	3.00
	815	1,183.3	680.6	3.00
	816	1,183.3	685.0	3.00
	817	1,183.9	690.2	3.00
	818	1,184.7	693.7	3.00
	819	1,186.4	697.2	3.00
	820	1,187.6	700.5	3.00
	821	1,188.5	704.7	3.00
	822	1,189.7	709.4	3.00
	823	1,190.3	712.9	3.00
	824	1,191.0	717.3	3.00
	825	1,192.2	721.2	3.00
	826	1,193.7	722.0	3.00
	827	1,194.4	723.6	3.00
	828	1,194.7	725.8	3.00
	829	1,194.2	728.5	3.00
	830	1,197.8	728.0	3.00
	831	1,199.9	731.9	3.00
	832	1,202.7	736.9	3.00
	833	1,205.2	742.3	3.00
	834	1,205.9	747.6	3.00
	835	1,209.3	752.7	3.00
	836	1,223.2	764.8	3.00
	837	1,229.4	767.7	3.00
	838	1,239.2	775.1	3.00
	839	1,257.9	788.1	3.00
	840	1,262.4	791.9	3.00

C:\TNM\YB\NewSet\BM0709\Alt4BM\A4080609

	841	1,267.0	794.0	3.00
	842	1,272.5	799.6	3.00
	843	1,294.5	811.0	3.00
	844	1,305.7	815.9	3.00
	845	1,312.6	820.8	3.00
	846	1,318.8	823.7	3.00
	847	1,323.2	825.6	3.00
	848	1,325.4	826.1	3.00
	849	1,333.6	825.3	3.00
	850	1,334.4	825.7	3.00
	851	1,335.4	827.4	3.00
	852	1,337.0	828.7	3.00
	853	1,338.4	828.8	3.00
	854	1,340.0	826.6	3.00
	855	1,344.4	825.1	3.00
	856	1,351.7	829.0	3.00
	857	1,359.1	833.1	3.00
	858	1,361.3	834.5	3.00
	864	1,360.8	836.6	3.00
	865	1,355.7	842.5	3.00
	868	1,354.4	844.7	3.00
Terrain Line137	869	993.1	522.3	48.00
	870	992.3	505.4	50.00
	871	992.1	495.6	52.00
	872	990.7	485.9	52.50
	873	990.2	474.8	53.00
	874	989.5	445.6	55.00
	875	992.4	419.6	58.00
	876	990.0	376.3	61.00
	877	989.9	347.9	62.00
	878	995.0	340.8	58.00
	879	998.9	335.5	57.00
	880	1,000.8	332.5	56.50
	881	1,002.4	329.8	56.00
Terrain Line138	882	1,002.5	407.0	52.00
	883	1,005.9	407.0	51.80

INPUT: TERRAIN LINES

	884	1,015.3	407.0	51.80
	885	1,020.0	405.4	51.80
	886	1,021.9	402.4	51.80

Yerba Buena Island 08080090.11



INPUT: GROUND ZONES

EDAW/AECOM  
Maddux B.

13 August 2009  
TNM 2.5

INPUT: GROUND ZONES

PROJECT/CONTRACT:

Yerba Buena Island 08080090.11

RUN:

Future Alternative 4

Ground Zone		Points			
Name	Type	Flow Resistivity cgs rayls	No.	Coordinates	
				X	Y
				m	m
Ground Zone2	Lawn	300	1	989.3	451.3
			2	1,012.7	474.3
			3	1,043.0	472.6
			4	1,043.0	355.9
			5	1,110.3	368.6
			6	1,129.9	447.9
			7	1,096.2	481.1
			8	1,060.4	577.4
			9	1,071.9	619.1
			10	1,100.9	658.5
			11	1,050.6	684.5
			12	1,018.3	639.8
			13	991.4	604.4
			14	979.9	582.2
			15	979.9	558.8
			16	985.5	546.9
			17	995.7	517.9
			18	994.0	494.9

Yerba Buena Island 08080090.11

## RESULTS: SOUND LEVELS

Yerba Buena Island 08080090.11

EDAW/AECOM  
Maddux B.20 October 2009  
TNM 2.5  
Calculated with TNM 2.5

## RESULTS: SOUND LEVELS

PROJECT/CONTRACT:

Yerba Buena Island 08080090.11

RUN:

Future Alternative 4

BARRIER DESIGN:

INPUT HEIGHTS

Average pavement type shall be used unless  
a State highway agency substantiates the use  
of a different type with approval of FHWA.

ATMOSPHERICS:

20 deg C, 50% RH

Receiver															
Name	No.	#DUs	Existing LAeq1h	No Barrier			Increase over existing			Type Impact	With Barrier		Noise Reduction		Calculated minus Goal
				LAeq1h		Crit'n	Calculated	Crit'n	Sub'l Inc		Calculated LAeq1h	Calculated	Goal		
				Calculated	dBA									dBA	
R-1	9	1	67.4	67.4	71	0.0	12	----		67.4	0.0	5		-5.0	
R-2 (ST-1)	16	1	71.4	68.5	71	-2.9	12	----		68.5	0.0	5		-5.0	
R-3	17	1	71.4	72.7	66	1.3	12	Snd Lvl		72.7	0.0	5		-5.0	
R-4 (ST-3)	18	1	71.4	67.0	71	-4.4	12	----		67.0	0.0	5		-5.0	
R-5	19	1	70.4	66.9	71	-3.5	12	----		66.9	0.0	5		-5.0	
R-6	20	1	0.0	66.5	66	66.5	12	Snd Lvl		66.5	0.0	5		-5.0	
R-7	21	1	0.0	67.4	66	67.4	12	Snd Lvl		67.4	0.0	5		-5.0	
R-8	22	1	0.0	64.3	66	64.3	12	----		64.3	0.0	5		-5.0	
R-9	24	1	0.0	63.0	66	63.0	12	----		63.0	0.0	5		-5.0	
R-10 (ST-2)	25	1	65.9	65.3	66	-0.6	12	----		65.3	0.0	5		-5.0	
R-11	38	1	0.0	53.5	66	53.5	12	----		53.5	0.0	5		-5.0	
R-12 (ST-4)	39	1	63.5	65.9	66	2.4	12	----		65.9	0.0	5		-5.0	
R-13 (ST-5)	40	1	60.9	57.6	71	-3.3	12	----		57.6	0.0	5		-5.0	
R-14	41	1	0.0	65.4	66	65.4	12	----		65.4	0.0	5		-5.0	
R-15	42	1	0.0	63.7	66	63.7	12	----		63.7	0.0	5		-5.0	
R-16	43	1	73.1	72.5	71	-0.6	12	Snd Lvl		72.5	0.0	5		-5.0	
R-17	54	1	0.0	61.0	66	61.0	12	----		61.0	0.0	5		-5.0	

Dwelling Units	# DUs	Noise Reduction		
		Min	Avg	Max
		dB	dB	dB
All Selected	17	0.0	0.0	0.0
All Impacted	4	0.0	0.0	0.0
All that meet NR Goal	0	0.0	0.0	0.0

**APPENDIX N**

**NATURAL ENVIRONMENT STUDY**







## **Natural Environment Study**

Yerba Buena Island Ramps Improvement Project

City and County of San Francisco

District 04-SF-80-(KP 12.2/13.1) PM

04-3A640

**January 2011**







# Natural Environment Study

Yerba Buena Island Ramps Improvement Project

City and County of San Francisco


District 04-SF-80-(KP 12.2/13.1) PM

04-3A640

January 2011

STATE OF CALIFORNIA  
Department of Transportation

San Francisco County Transportation Authority

Prepared By:  Date: 01/14/11

Angie Harbin-Ireland  
(510) 622-6600  
AECOM

Reviewed By:  Date: 01/14/11

Stefan Galvez-Abadia, SFOBB Environmental Compliance Manager  
(510) 867-6785  
Office of Biological Sciences and Permits  
District 4, California Department of Transportation

Approved By:  Date: 01/14/11

Jeffrey G. Jensen, District Office Chief  
(510) 622-8729  
Office of Biological Sciences and Permits  
District 4, California Department of Transportation



## Summary

This report presents the results of the Natural Environment Study (NES) for the Yerba Buena Island (YBI) Ramps Improvement Project. The San Francisco County Transportation Authority (Authority) and California Department of Transportation (Caltrans) proposes to remove the west-bound on- and off-ramps located on the east side of the island from the San Francisco – Oakland Bay Bridge (SFOBB) to YBI. New westbound on-and off-ramps to replace the current ramps, would be constructed.

The existing configuration of the westbound on- and off-ramps from Interstate 80 (I-80) to YBI, have not been updated since the 1960s and do not meet Caltrans current geometric standards. The replacement ramps would address traffic safety requirements, and design standards.

### 1. Habitat Types in Biological Study Area

Vegetation communities and wildlife habitats within the approximate 33.553-acre Biological Study Area (BSA) on the easternmost portion of YBI can generally be described as a mosaic of nonnative ornamental and invasive vegetation with relatively small patches of remnant native species. Vegetation communities found on-site are eucalyptus woodland (4.110 acres), mixed broadleaf-conifer forest (3.326 acres), nonnative scrub/shrubland (1.181 acre), northern foredune (0.440 acre), central coast riparian scrub (0.028 acre), landscaped/disturbed (3.788 acres), and ruderal/disturbed (1.065 acre). These are found in a matrix of urban hardscape land and bare ground (paved roads, buildings, parking lots, and construction areas) totaling 19.615 acres. Remnant patches of native communities found within the larger communities are northern (Franciscan) coastal scrub, northern coastal bluff scrub, and Coast live oak woodland; however these patches were not considered to be of high enough functional value to be discretely mapped.

### 2. US Army Corps of Engineers Jurisdictional Area

No evidence of wetlands was found in the BSA. The mean high tide water level corresponds to federally jurisdictional tidal waters of the Bay under the U.S. Army Corps of Engineers. Aquatic habitats on-site consist solely of unvegetated- waters flowing in concreted or roadside swales totaling 0.04 acre (1,852 square feet) of the total 33.553-acres BSA, which may be considered waters of the U.S. and state, subject to verification. If jurisdiction is confirmed by one or all of these agencies, the



appropriate permit applications will be submitted for temporary project impacts to these features.

### **3. San Francisco Bay Conservation and Development Commission Jurisdictional Area**

BCDC jurisdiction includes waters of the Bay and extends 100 feet onto the shore from the mean high tide line encompassing any aquatic habitats as well as uplands. Of the total 0.04 acre (1,852 square feet) of unvegetated waters on site, 0.009 acres (386.49 square feet) may also be regulated by the BCDC. The remaining lands within 100 feet of the mean high tide that fall within the study area are considered uplands. The southeast edge of the study area boundary runs at or slightly above the mean high tide line. On the northern edge of the study area, the boundary is well above the mean high tide line. Under alternative 2b there will be no temporary or permanent impacts to lands falling under the permit authority of BCDC. Alternative 4 will involve permanent impacts to 0.25 acres and temporary disturbance to lands totaling 0.36 acres which fall under the purview of BCDC. Temporarily disturbed habitats within BCDC jurisdiction are uplands and will be restored to their natural condition after completion of the project. A BCDC permit will be obtained for any work within their jurisdiction under Alternative 4. A consistency determination within the park priority use designation for YBI will be requested.

### **4. Potentially Occurring Special Status Species**

Habitats identified above that are of special concern are northern foredune, central coast riparian scrub, and aquatic features. Two special status plant species, stinging phacelia, and large-flowered sand-spurry were observed in the BSA during focused botanical surveys (Table 2). Several special-status animal species which occur in the region or vicinity of the site are not expected to be present due to a lack of suitable habitat or connectivity to known populations. The BSA boundary does not extend into the San Francisco Bay (Bay) and on-site aquatic habitats are limited to roadside swales. The historic disturbance of vegetation on-site has diminished the habitat quality on this portion of YBI. Special-status species with potential to occur on-site are primarily birds and bats (e.g. Cooper's hawk, western red bat, Table 2) that are moderately tolerant of human disturbance which may nest or roost in remnant natural vegetation and structures on-site. In addition, there is a low potential for the state-listed threatened bank swallow to occur on the hillside behind the project area.

## 5. Avoidance and Minimization Measures

Pre-construction surveys, contractor education, and other standard avoidance measures will be implemented for potentially occurring special-status plants, invertebrates, roosting bats, and nesting birds. The tidal waters of the Bay will be protected by permanent project features and should not be affected by temporary construction activities. Standard construction best management practices (BMP's) will be implemented to treat and minimize runoff into the Bay.

Based on the Alternative 2B project design which avoids sensitive aquatic habitats, restricts pile driving of steel H-piles to a minimum of 300 feet from the shoreline and implements BMPs, this alternative will have no effect on fisheries or marine mammals. Alternative 4 will also implement BMPs and avoid direct impacts to aquatic habitats however it will involve pile driving steel H-piles within 90 feet of the shoreline. It is also anticipated that this alternative will have no effect on fisheries or marine mammal behavior patterns in the area based on a hydroacoustic analysis performed by Illingworth & Rodkin (2011).

Based on an absence of suitable habitat and isolation from known populations in the region, terrestrial species listed under the Federal Endangered Species Act (FESA) are not expected to occur on the site. Proposed avoidance and minimization measures will reduce potential project impacts to species listed under the California Endangered Species Act (CESA) that occur in the vicinity of the project area or have potential to occur on the site, i.e., bank swallow. Based on the project's avoidance of this species and its potential habitat a 2081 from the California Department of Fish and Game (CDFG) permit is not deemed necessary. Construction BMP's and project features will be reviewed with the San Francisco Regional Water Quality Control Board (RWQCB) to ensure that the project meets standards for water quality protection.

## Table of Contents

Summary .....	i
List of Figures .....	viii
List of Tables .....	viii
List of Abbreviated Terms .....	ix
 <b>Chapter 1.</b> Introduction .....	1
1.1. <i>Project History</i> .....	3
1.2. <i>Project Description</i> .....	3
<b>Chapter 2.</b> Study Methods .....	12
2.1. <i>Regulatory Requirements</i> .....	12
2.2. <i>Studies Required</i> .....	30
2.3. <i>Personnel and Survey Dates</i> .....	31
2.4. <i>Agency Coordination and Professional Contacts</i> .....	32
2.5. <i>Limitations That May Influence Results</i> .....	35
<b>Chapter 3.</b> Results: Environmental Setting .....	36
3.1. <i>Description of the Existing Biological and Physical Conditions</i> .....	36
3.1.1. BSA .....	36
3.1.2. Physical Conditions .....	37
3.1.3. Biological Conditions in the BSA .....	37
3.2. <i>Regional Species and Habitats of Concern</i> .....	46
<b>Chapter 4.</b> Results: Biological Resources, Discussion of Impacts and Mitigation... 54	
4.1. <i>Natural Communities of Special Concern</i> .....	54
4.1.1. Discussion of Aquatic Features .....	54
4.1.1.1. Survey Results For Aquatic Features .....	55
4.1.1.2. Avoidance and Minimization Efforts For Aquatic Features .....	55
4.1.1.3. Project Impacts for Aquatic Features .....	56
4.1.1.4. compensatory mitigation for aquatic features .....	57
4.1.1.5. cumulative impacts to aquatic features .....	58
4.1.2. Discussion of Northern Foredune .....	58
4.1.2.1. survey results for northern foredune .....	58
4.1.2.2. Avoidance and Minimization Efforts For Northern Foredune .....	58
4.1.2.3. project impacts for northern foredune .....	59
4.1.2.4. compensatory mitigation for northern foredune .....	59
4.1.2.5. cumulative impacts to northern foredune .....	59
4.1.3. Discussion of Central Coast Riparian Scrub .....	59
4.1.3.1. Survey Results for Central coast riparian scrub .....	59
4.1.3.2. Avoidance and Minimization Efforts for central coast riparian scrub ...	60
4.1.3.3. Project Impacts for central coast riparian scrub .....	60
4.1.3.4. Compensatory Mitigation for Central Coast riparian scrub .....	60
4.1.3.5. Cumulative impacts to Central coast riparian scrub .....	60
4.2. <i>Special Status Plant Species</i> .....	60
4.2.1. Discussion of Potentially Occurring Special-Status Plant Species Documented Within Five Miles of the Site .....	65
4.2.1.1. Life History and Habitat Requirements for Stinging Phacelia .....	65
4.2.1.2. Survey Results for Stinging Phacelia .....	65
4.2.1.3. Project Impacts on Stinging Phacelia .....	65
4.2.1.4. Avoidance and Mitigation Efforts for Stinging Phacelia .....	66



4.2.1.5. Compensatory Mitigation for Stinging Phacelia.....	66
4.2.1.6. Cumulative Impacts for Stinging Phacelia.....	66
4.2.2.1. Life History and Habitat Requirements for Large Flowered Sand-Spurrey ..	66
4.2.2.2. Survey Results for Large Flowered Sand-Spurrey.....	67
4.2.2.3. Project Impacts on Large Flowered Sand-Spurrey .....	67
4.2.2.4. Avoidance and Mitigation Efforts for Large Flowered Sand-Spurrey.....	67
4.2.2.5. Compensatory Mitigation for Large Flowered Sand-Spurrey .....	67
4.2.2.6. Cumulative Impacts for Large Flowered Sand-Spurrey .....	68
4.2.3.1. Life History and Habitat Requirements for Beach Layia.....	68
4.2.3.2. Survey Results for Beach Layia.....	68
4.2.3.3. Project Impacts on Beach Layia.....	68
4.2.3.4. Avoidance and Minimization Efforts for Beach Layia.....	69
4.2.3.5. Compensatory Mitigation for Beach Layia.....	69
4.2.3.6. Cumulative Impacts on Beach Layia .....	69
4.2.4.1. Life History and Habitat Requirements for California Sea-Blite.....	69
4.2.4.2. Survey Results for California Sea-Blite.....	69
4.2.4.3. Project Impacts on California Sea-Blite.....	70
4.2.4.4. Avoidance and Mitigation Efforts for California Sea-Blite.....	70
4.2.4.5. Compensatory Mitigation for California Sea-Blite.....	70
4.2.4.6. Cumulative Impacts for California Sea-Blite.....	70
4.2.5.1. Life History and Habitat Requirements for Choris's Popcorn Flower.....	70
4.2.5.2. Survey Results for Choris's popcorn flower.....	71
4.2.5.3. Project Impacts on Choris's popcorn flower.....	71
4.2.5.4. Avoidance and Mitigation Efforts for Choris's popcorn flower.....	71
4.2.5.5. Compensatory Mitigation for Choris's popcorn flower.....	71
4.2.5.6. Cumulative Impacts for Choris's popcorn flower.....	71
4.2.6.1. Life History and Habitat Requirements for Coastal Bluff Morning-Glory....	72
4.2.6.2. Survey Results for Coastal Bluff Morning-Glory .....	72
4.2.6.4. Avoidance and Mitigation Efforts for Coastal Bluff Morning-Glory .....	72
4.2.6.5. Compensatory Mitigation for Coastal Bluff Morning-Glory .....	72
4.2.6.6. Cumulative Impacts for Coastal Bluff Morning-Glory.....	73
4.2.7.1. Life History and Habitat Requirements for Dune Gilia .....	73
4.2.7.2. Survey Results for Dune Gilia .....	73
4.2.7.3. Project Impacts on Dune Gilia .....	73
4.2.7.4. Avoidance and Mitigation Efforts for Dune Gilia .....	73
4.2.7.5. Compensatory Mitigation for Dune Gilia .....	74
4.2.7.6. Cumulative Impacts for Dune Gilia .....	74
4.2.8.1. Life History and Habitat Requirements for Fragrant Fritillary .....	74
4.2.8.2. Survey Results for Fragrant Fritillary .....	74
4.2.8.3. Project Impacts on Fragrant Fritillary .....	74
4.2.8.4. Avoidance and Mitigation Efforts for Fragrant Fritillary .....	75
4.2.8.5. Compensatory Mitigation for Fragrant Fritillary .....	75
4.2.8.6. Cumulative Impacts for Fragrant Fritillary .....	75
4.2.9.1. Life History and Habitat Requirements for Pt. Reyes Birds-beak .....	75
4.2.9.2. Survey Results for Pt. Reyes Birds-beak .....	75
4.2.9.3. Project Impacts on Pt. Reyes Birds-beak .....	76
4.2.9.4. Avoidance and Mitigation Efforts for Pt. Reyes Birds-beak .....	76
4.2.9.5. Compensatory Mitigation for Pt. Reyes Birds-beak .....	76
4.2.9.6. Cumulative Impacts for Pt. Reyes Birds-beak .....	76
4.2.10.1. Life History and Habitat Requirements for Robust Spineflower.....	76
4.2.10.2. Survey Results for Robust Spineflower.....	77

4.2.10.3. Project Impacts on Robust Spineflower.....	77
4.2.10.4. Avoidance and Mitigation Efforts for Robust Spineflower .....	77
4.2.10.5. Compensatory Mitigation for Robust Spineflower .....	77
4.2.10.6. Cumulative Impacts for Robust Spineflower .....	77
4.2.11.1. Life History and Habitat Requirements for San Francisco Campion.....	77
4.2.11.2. Survey Results for San Francisco Campion.....	78
4.2.11.3. Project Impacts on San Francisco Campion .....	78
4.2.11.4. Avoidance and Mitigation Efforts for San Francisco Campion.....	78
4.2.11.5. Compensatory Mitigation for San Francisco Campion.....	78
4.2.11.6. Cumulative Impacts for San Francisco Campion.....	78
4.2.12.1. Life History and Habitat Requirements for San Francisco Gumplant .....	78
4.2.12.2. Survey Results for San Francisco Gumplant .....	79
4.2.12.3. Project Impacts on San Francisco Gumplant .....	79
4.2.12.4. Avoidance and Mitigation Efforts for San Francisco Gumplant .....	79
4.2.12.5. Compensatory Mitigation for San Francisco Gumplant .....	79
4.2.12.6. Cumulative Impacts for San Francisco Gumplant .....	79
4.2.13.1. Life History and Habitat Requirements for San Francisco Lessingia.....	80
4.2.13.2. Survey Results for San Francisco Lessingia.....	80
4.2.13.3. Project Impacts on San Francisco Lessingia.....	80
4.2.13.4. Avoidance and Mitigation Efforts for San Francisco Lessingia .....	80
4.2.13.5. Compensatory Mitigation for San Francisco Lessingia.....	80
4.2.13.6. Cumulative Impacts for San Francisco Lessingia.....	81
4.2.14.1. Life History and Habitat Requirements for Santa Cruz Microseris.....	81
4.2.14.2. Survey Results for Santa Cruz Microseris .....	81
4.2.14.3. Project Impacts on Santa Cruz Microseris .....	81
4.2.14.4. Avoidance and Mitigation Efforts for Santa Cruz Microseris .....	81
4.2.14.5. Compensatory Mitigation for Santa Cruz Microseris .....	81
4.2.14.6. Cumulative Impacts for Santa Cruz Microseris .....	82
4.3. <i>Special Status Animal Species</i> .....	82
4.3.1. Discussion of Special-Status Invertebrates .....	82
4.3.1.1 Sandy Beach Tiger Beetle.....	83
4.3.1.2 Monarch Butterfly.....	84
4.3.1.3 Gummiifera Leaf-Cutter Bee .....	87
4.3.1.4 San Francisco Lacewing .....	88
4.3.2. Discussion of Special-Status Fish .....	90
4.3.3. Discussion of Special-Status Reptiles and Amphibians.....	93
4.3.4. Discussion of Special-Status Raptors .....	94
4.3.4.1 Cooper's Hawk .....	96
4.3.4.2. Golden Eagle.....	98
4.3.4.3 White-Tailed Kite .....	101
4.3.4.4 American Peregrine Falcon.....	104
4.3.5. Discussion of Special Status Birds (Non-Raptors) .....	107
4.3.5.1. Passerines and Non-Passerine Landbirds.....	107
4.3.5.2. Shorebirds, Marshbirds, and Waterbirds.....	111
4.3.5.3 California Brown Pelican.....	115
4.3.5.4 Double-Crested Cormorant.....	117
4.3.6 Discussion of Special-Status Terrestrial Mammals .....	119
4.3.6.1 Special-Status Bats.....	120
4.3.6.2 Dusky Footed Woodrat.....	123
4.3.7 Discussion of Special-Status Marine Mammals .....	125
4.3.7.1 Harbor Seal .....	126

4.3.7.2	California Sea Lion .....	130
<b>Chapter 5.</b>	Results: Permits and Technical Studies for Special Laws or Conditions 134	
5.1.	<i>FESA (Federal Endangered Species Act) Consultation Summary.....</i>	134
5.2.	<i>Federal Fisheries and EFH (Essential Fish Habitat) Consultation Summary .....</i>	134
5.3.	<i>CESA (California Endangered Species Act) Consultation Summary .....</i>	134
5.4.	<i>Wetlands and Other Waters Coordination Summary.....</i>	135
5.5.	<i>County Tree Ordinance Coordination Summary.....</i>	135
<b>Chapter 6.</b>	References.....	136
<b>Appendix A</b>	Regionally Occurring Special-Status Animal Species.....	145
<b>Appendix B</b>	Regionally Occurring Special-Status Plants .....	155
<b>Appendix C</b>	CNDDB Report.....	171
<b>Appendix D</b>	USFWS List.....	177



## List of Figures

Figure 1. Regional Location .....	2
Figure 2a. BSA - Aerial .....	4
Figure 2b. BSA -Topo .....	5
Figure 3a. Alternative 2b .....	7
Figure 3b. Alternative 4 .....	8
Figure 4. Vegetation Communities .....	14
Figure 5a. Special-Status Species (Plants) .....	15
Figure 5b. Special-Status Species (Animals) .....	16
Figure 6a. Alternative 4 Impacts to Vegetation Communities and Aquatic Habitats ..	17
Figure 6b. Alternative 2b Impacts to Vegetation Communities and Aquatic Habitats	18
Figure 6a. Alternative 2b Impacts to Special Status Plants .....	63
Figure 7a. Alternative 4 Impacts to Special Status Plants .....	64

## List of Tables

Table 1. Habitat Type and Area .....	38
Table 2: Listed, Proposed Species, and Critical Habitat Potentially Occurring or Known to Occur in the Project Area. ....	48
Table 3. Jurisdictional Waters .....	57
Table 4. BCDC Jurisdiction .....	57
Table 5. Marine Mammal Disturbance Thresholds for Marine Construction Activities .....	129
Table 6. Marine Mammal Disturbance Thresholds for Marine Construction Activities .....	132

## **List of Abbreviated Terms**

Authority	San Francisco County Transportation Authority
Bay Plan	San Francisco Bay Plan
BCDC	San Francisco Bay Conservation and Development Commission
BMPs	Best Management Practices
Caltrans	California Department of Transportation
CDFG	California Department of Fish and Game
CEQA	California Environmental Quality Act
CESA	California Endangered Species Act
CH	Critical Habitat
City	City of San Francisco
CNDDDB	California Natural Diversity Data Base - California Department of Fish and Game
CNPS	California Native Plant Society
CWA	Clean Water Act
CZMA	Coastal Zone Management Act
dB	Decibels
DBH	Diameter at breast height (~4 ft)
DPS	Distinct Population Segment
Eagle Act	The Bald and Golden Eagle Protection Act
EFH	Essential Fish Habitat
EO	Executive Order
EPA	United States Environmental Protection Agency
ESA	Ecologically Sensitive Area
FEIR	Final Environmental Impact Report
FESA	Federal Endangered Species Act
FFMPs	Federal Fishery Management Plans
ft	foot/feet
HCP	Habitat Conservation Plan
I-80	Interstate 80
km	kilometer(s)

KP	kilometer post
M	meter(s)
MBTA	Migratory Bird Treaty Act
mi	mile(s)
MMPA	Marine Mammal Protection Act
MOU	Memorandum of Understanding
MPA	McAteer-Petris Act
MSFCMA	Magnuson-Stevens Fishery Conservation and Management Act
NEPA	National Environmental Policy Act
NES	Natural Environment Study
NMFS	National Marine Fisheries Service
NOAA - Fisheries	National Oceanic and Atmospheric Administration - National Marine Fisheries Service
NPPA	Native Plant Protection Act
NPS	National Park Service
NRCS	Natural Resources Conservation Service
PM	post mile
RMS	root-mean-square pressure
RWQCB	Regional Water Quality Control Board
SCPBRG	Santa Cruz Predatory Bird Research Group
SFGP	San Francisco General Plan
SFOBB	San Francisco-Oakland Bay Bridge
SFPD	San Francisco Planning Department
SWANCC	Solid Waste Agency of Northern Cook County v. USACE
USACE	Army Corps of Engineers
USCG	United States Coast Guard
USFWS	United States Fish and Wildlife Service
USGS	United States Geological Survey
USN	United States Navy
YBI	Yerba Buena Island



## **Chapter 1. Introduction**

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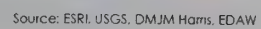
This report presents the results of the Natural Environment Study (NES) for the Yerba Buena Island (YBI) Ramps Improvement Project. The report addresses potential impacts to biological resources that may result from the YBI Ramps Improvement Project. The findings of this report will be incorporated into the environmental documents prepared for the YBI Ramps Improvement Project, as required by the National Environmental Policy Act (NEPA) of 1969 and the California Environmental Quality Act (CEQA) of 1970.

The San Francisco County Transportation Authority (Authority) proposes to improve the safety and functionality of the east- and westbound on- and off-ramps from the San Francisco – Oakland Bay Bridge (SFOBB) to YBI (Figure 1). The California Department of Transportation (Caltrans) is the federal lead agency and will provide project oversight. YBI lies approximately halfway between Oakland and San Francisco, in the Bay, and is only accessible to auto traffic via the SFOBB stretch of Interstate 80 (I-80).

The proposed project would replace the existing westbound on-ramp and the westbound off-ramp located on the eastern side of YBI with a new westbound on-ramp and a new westbound off-ramp that replicate the functional roles of the current ramps. The replacement ramps would also address traffic safety requirements, and design standards.

The purpose of the proposed project is to address the geometric and operational deficiencies of the existing on- and off-ramps to the extent physically and economically feasible; improve traffic operations to and from the SFOBB and improve traffic safety by increasing deceleration length for westbound off-ramps, and increasing merging distance for the westbound on-ramps. The new ramps would meet Caltrans current seismic and traffic safety requirements and design standards.

# Yerba Buena Island Ramps Improvement Project



## 1.1. Project History

The original SFOBB and YBI tunnel opened to traffic in 1936, and included the westbound on- and off-ramps still in use today. In the late 1930's additional timber on-and off-ramps were added to increase access to the inland from the upper and lower deck. The upper deck originally carried both westbound and eastbound auto traffic, while the lower deck was dedicated to passenger rail and truck traffic. In 1960, Caltrans removed the passenger rail line from the lower deck and converted it to eastbound auto traffic, and in turn dedicated the upper deck to westbound traffic. In 1962 the timber ramps were removed and replaced with the westbound and eastbound ramps on the west side of the tunnel and the eastbound on-ramps and off-ramps on the east side of the YBI tunnel. These ramps have remained unchanged since that time.

The purpose of the project is to improve traffic operations between Yerba Buena Island (YBI) and westbound Interstate 80 (I-80), and to improve safety by improving the geometric configurations of the westbound I-80 on-ramp and westbound I-80 off-ramp that are located east of the YBI / I-80 tunnel.

## 1.2. Project Description

Yerba Buena Island (YBI) is located in the San Francisco Bay approximately halfway between Oakland and San Francisco. YBI is only accessible to vehicular traffic via the San Francisco Oakland Bay Bridge (SFOBB) stretch of I-80. The SFOBB is considered a "lifeline structure" and is a critical link between the East Bay and San Francisco. It provides the only vehicle access to YBI, the active U.S. Coast Guard (USCG) facilities located on the south side of the island, and Treasure Island, located immediately north of YBI (Figure 2).

The proposed project would replace the existing westbound on- and off-ramps located on the east side of YBI with new westbound on- and off-ramps. The new ramps would maintain the functional role of the current ramps while satisfying seismic requirements, highway design standards, traffic operations, and improve safety. The YBI Ramps Improvement Project is independent of both the SFOBB East Span Seismic Safety Project, currently under construction, and the Treasure Island and Yerba Buena Island (TI/YBI) Redevelopment Plan, currently undergoing its own environmental review process.



Figure 2a:  
Study Area



Study Area

Image: Google 2006  
Data: DMJM Horns, EDAY

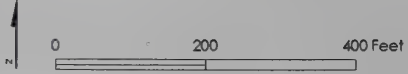




Figure 2b:  
Study Area



Study Area

1' Contour  
5' Contour



The purpose of the project is to improve the safety of the westbound on- and off-ramps to the extent physically and economically feasible. The proposed project would provide standard deceleration length for the off-ramp and improved acceleration/merging length for the on-ramp. In addition, the project would improve traffic operations to and from YBI. Alternatives have been proposed to address the geometric deficiencies of the existing on- and off-ramps (Figure 3a, 3b). In addition to the no-build alternative, the proposed build alternatives would analyze the effects to the SFOBB (I-80) mainline structure and YBI. The proposed project is located between post-mile (PM) 7.6 and 8.1<sup>1</sup> beginning at the east portal of the YBI tunnel and ending at the east side of the Transition Structure portion of the new SFOBB. The SFOBB Transition Structure is located between PM 7.9 and 8.1 between the YBI tunnel and the SFOBB Self-Anchored Suspension (SAS) span<sup>2</sup>. Construction would occur from April 2012 to 2014 under either alternative.

Three alternatives are currently under consideration, including:

### **No Build Alternative**

This Alternative assumes that the existing on- and off-ramps would remain in place and no further action or improvements would occur.

### **Alternative 2b**

Alternative 2b would include removal of the existing westbound on- and off ramps on the east side of YBI, construction of a westbound loop on-ramp from Macalla Road on the east side of YBI, and construction of a westbound off-ramp to Macalla Road on the east side of YBI (Figure 3a).

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<sup>1</sup> 1 Kilometer Post (KP) 12.3 and 13.22

<sup>2</sup> The SFOBB Transition Structure is the name of a section of the new Bay Bridge. The Transition Structure will connect the Self-Anchored Suspension (SAS) span to Yerba Buena Island, and will transition the East Span's side-by-side road decks to the upper and lower decks of the YBI tunnel and West Span.



**Figure 3a:**  
**Alternative 2b**

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## LAYOUT ALTERNATIVE 2B

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$$1.1 \times 10^{-10} \text{ mol/L} \times 100 \text{ mL} = 1.1 \times 10^{-8} \text{ mol}$$

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	1	2
	3	4

4

1

1

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1

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	2

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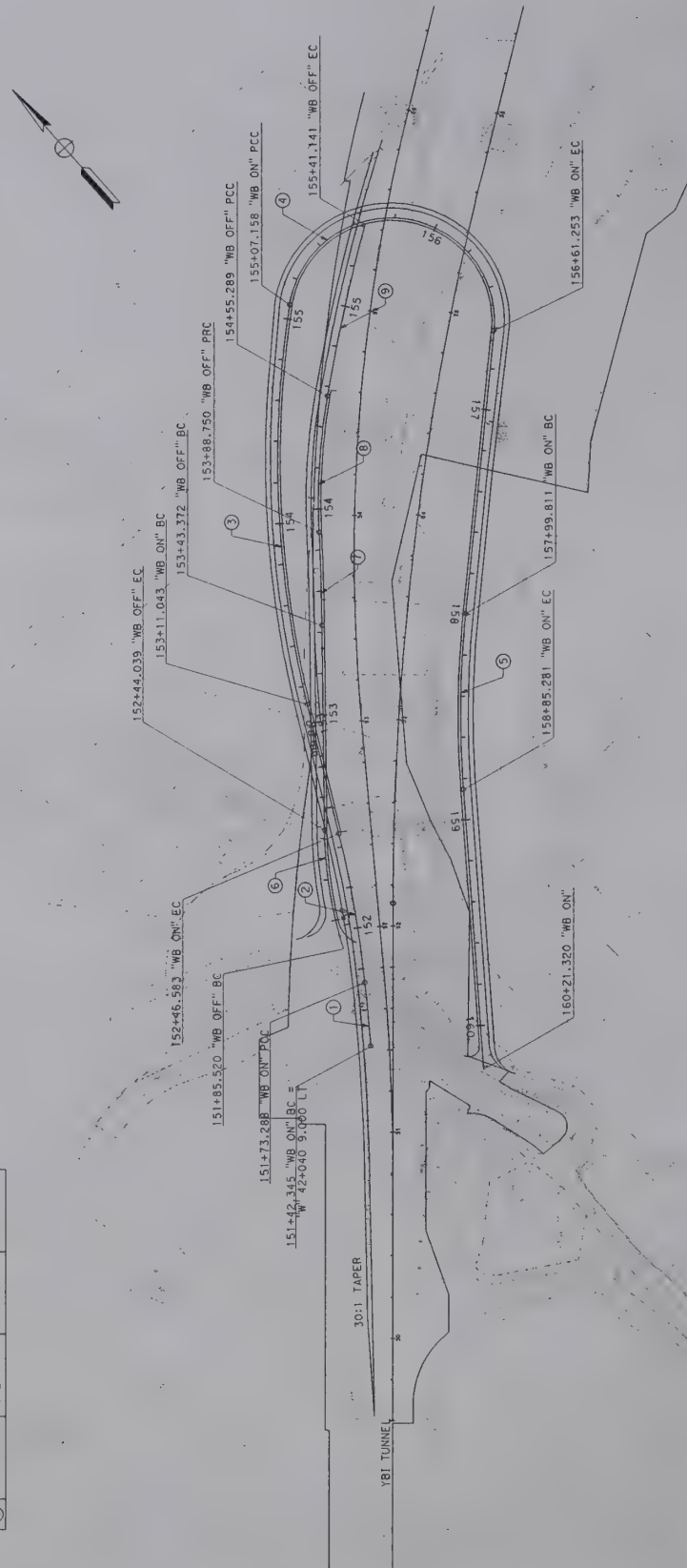
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1

Yerba Buena Island  
Ramps Improvement Project

CURVE DATA TABLE					
		RADIUS	DELTA	TANGENT	LENGTH
①	1054.000	1°40'55"	15.473	30.943	
②	558.520	7°31'08"	36.700	73.295	
③	400.000	22°28'33"	99.334	196.115	
④	49.900	176°55'58"	1863.827	134.094	
⑤	500.000	9°47'35"	42.639	85.470	
⑥	200.000	16°45'52"	29.470	59.519	
⑦	1370.000	1°53'52"	22.691	45.377	
⑧	310.000	12°17'53"	33.398	66.540	
⑨	909.000	5°24'41"	42.958	85.852	



## LAYOUT ALTERNATIVE 4

This alternative proposes to reconstruct two of the existing six on- and off-ramps at the I-80/YBI interchange. The proposed on- and off-ramps would provide standard shoulder widths, and would include the following features:

- Westbound on-ramp on the east side of YBI- This ramp would begin at a “T” intersection at Macalla Road, loop right with a tight radius, and merge on to the north side of the SFOBB. The length of this ramp would be approximately 267 meters (876 feet). This ramp would have two traffic lanes, merging into one as it connects to the SFOBB. One lane would be a high occupancy vehicle (HOV) lane and the other a mixed-flow<sup>3</sup> lane.
- Westbound off-ramp on the east side of YBI - This ramp would diverge from the new SFOBB Transition Structure between bents W3 and W4 curving around the Nimitz House and terminate at a “T” intersection at Macalla Road. The length of this ramp would be approximately 340 meters (1,115 feet). A stop sign is proposed at the ramp terminus.
- Macalla Road would be widened for approximately 202 meters (662.7 feet) adjacent to the terminus of the westbound on- and off-ramps. The existing roadway is about 6 meters (19.7 feet) wide near the ramp terminus. The roadway widening is required to accommodate a 3.7 meters (12.1 feet) wide multi-use pedestrian/bike path and two 3.7 meters (12.1 feet) wide lanes within the Caltrans right-of-way. A retaining wall would be constructed adjacent to Macalla Road to provide the required width. The height of the retaining wall would vary from 1.2 to 4.9 meters (3.9 to 16.1 feet) and would retain the hillside above Macalla Road. The stairway adjacent to the Caltrans Substation would be relocated to the west side of the building to make room for the new retaining wall. The roadway width would vary around the curve at South Gate Road to provide proper width for truck turning movements.
- Under Alternative 2B, the westbound on- and off-ramps would terminate at Macalla Road where Quarters 10 and Building 267 are currently located<sup>4</sup>. Quarters 10 and Building 267 would be relocated prior to construction of the ramps at Macalla Road. The relocation site for these buildings would be on YBI and would be determined under the Section 106 mitigation development process.

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<sup>3</sup> A mixed-flow lane is a general purpose travel lane with no traffic restrictions.

<sup>4</sup> Quarters 10 and Building 267 (a contributing garage) are listed in the National Register of Historic Places and significant at the local level under Criterion C, as a significant example of mid-twentieth century residential architecture.



## Alternative 4

Alternative 4 would include the removal of the existing westbound on- and off ramps on the east side of YBI, construction of westbound on-ramp from South Gate Road, and construction of westbound off-ramp to North Gate Road on the east side of YBI (Figure 3b).

This alternative proposes to reconstruct two of the existing six on- and off-ramps at the I-80/YBI interchange. The proposed on- and off-ramps would provide standard shoulder widths, and would include the following features:

- Westbound on-ramp on the east side of YBI - This ramp would begin at South Gate Road, proceed east paralleling the eastbound on-ramp, loop under the new SFOBB Transition Structure near its eastern end to provide adequate merging distances, cross over the westbound off-ramp along the north side of the SFOBB. The length of this ramp would be approximately 879 meters (2,883 feet). HOV lane would not be provided under Alternative 4.
- Westbound off-ramp on the east side of YBI. This ramp would diverge from the new SFOBB Transition Structure between bents W2 and W3, parallel the Transition Structure, cross under the westbound on-ramp, and terminate at a "T" intersection at North Gate Road. The length of this ramp would be approximately 356 meters (1,168 feet)... A stop sign is proposed at the ramp terminus and meets the 20-year design needs. An HOV lane would not be provided.
- Pavement reconstruction on Macalla Road and South Gate Road at the ramp intersections is proposed to ensure a proper pavement conform and truck turning movements.
- Quarters 10/Building 267 and associated landscaping would remain in place.

## Tree and Sensitive Plant Replacement

As part of the project, the SFCTA will plant replacement trees and vegetation to benefit aesthetics as well as native plant and wildlife habitat values on the island post construction.

Temporarily disturbed woodland and forested areas would be restored after completion of construction activities. Any trees removed in temporary disturbance areas would be replaced at a minimum 1:1 ratio utilizing native species appropriate to the island. Approximately 130 trees would be removed, of which approximately 90% are greater than 6.1 meters (20 feet) high with a trunk size greater than 30.5 centimeters (12 inches). Trees native to YBI that are removed, such as 2 Coast live oak trees, would be replaced at a 3:1 ratio. Other permanently affected woodland and forest habitat will be replanted at a 1:1 ratio at a location identified in coordination with stakeholder agencies and utilizing native species appropriate to the location.

A sensitive, native plant species, stinging phacelia (*Phacelia malvifolia*), has been documented within the mixed broadleaf conifer and eucalyptus woodland forest habitat in the BSA. A portion of the population will be affected by construction activities. This plant is considered a Rare, Unusual, or Significant plant of local concern (A2) by the East Bay Chapter of the CNPS. Stinging phacelia plants temporarily and/or permanently removed during project construction will be replanted at a 1:1 ratio as part of the woodland habitat revegetation effort. This may be achieved through the following methods:

1. Harvest the plants to be permanently lost or temporarily disturbed, and relocate them a suitable and equal-sized area either within the project site or off-site that would be avoided or restored; or
2. Harvest seeds from the plants to be permanently lost or temporarily disturbed, or use seeds from another appropriate source, and seed an equal amount of area suitable for growing the plant either within the project site or off-site that would be avoided or restored.

SFCTA will develop a woodland habitat revegetation plan 30 days prior to construction that outlines an implementation strategy, monitoring plan, and performance standards to facilitate and document success of the revegetation effort. The revegetation plan will be implemented under the oversight of a qualified biologist.

## **Chapter 2. Study Methods**

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In accordance with guidelines outlined in the Caltrans Guidance Documents (Caltrans 2000, Caltrans 1997), biological resources were mapped, and a reconnaissance-level biological resources assessment and wetland delineation were completed for the YBI Ramps Improvement Project (Figures 4-6b). Specific regulatory requirements and survey methods are outlined below.

### **2.1. Regulatory Requirements**

Riparian areas, wetlands, other waters of the U.S., waters of the State, special-status species, and sensitive natural communities are considered sensitive biological resources and fall under the jurisdiction of several state and federal regulatory agencies. Impacts or potential impacts to these resources often require federal, state, and/or local permits, depending on the type and extent of project impacts. Regulatory jurisdictions of these agencies and relevant laws, ordinances, and regulations pertinent to biological resources occurring on-site or in the vicinity of the site are described below for context. Notification and/or coordination with most of these agencies will occur as part of the NEPA and CEQA process, however in some cases the project will have no affect on resources regulated by a particular agency and further permits or coordination will not be necessary. Additional agency coordination and permits needed for the project are detailed in Section 5 of this document.

#### **U.S. Army Corps of Engineers**

##### *Clean Water Act*

Section 404 of the Clean Water Act (CWA) of 1972 regulates activities that result in the discharge of dredged or fill material into waters of the United States, including wetlands. The primary intent of the CWA is to authorize the Environmental Protection Agency (EPA) to regulate water quality through the restriction of pollution discharges, which includes sediments. The U.S. Army Corps of Engineers (USACE) has the principal authority to regulate discharges of dredged or fill material into waters of the United States. However, the EPA has oversight authority over the USACE and retains veto power over the USACE decision to issue permits.

Waters of the United States include:



1. all waters which are currently used, or were used in the past, or may be susceptible to use in interstate or foreign commerce, including all waters which are subject to the ebb and flow of tide;
2. all interstate waters including interstate wetlands;
3. all other waters such as intrastate lakes, rivers, streams (including intermittent streams), mudflats, sandflats, wetlands, sloughs, prairie potholes, vernal pools, wet meadows, playa lakes, or natural ponds, the use, degradation or destruction of which could affect interstate or foreign commerce;
4. tributaries of the above; and
5. territorial seas.

Federal jurisdictional wetlands are defined as those areas that are inundated or saturated by surface water at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions. Wetlands generally include swamps, bogs, vernal pools, seeps, marshes and similar areas.

Figure 4:  
Vegetation Communities



**Vegetation Communities**

- Central Coast Riparian Scrub (.028 ac)
- Eucalyptus Woodland (4.110 ac)
- Landscaped/Disturbed (3.788 ac)
- Mixed Broadleaf-Conifer Forest (3.326 ac)
- Nonnative Scrub/Shrubland (1.181 ac)
- Northern Foredune (.440 ac)
- Ruderal/Disturbed (1.065 ac)
- Urban (19.615 ac)

- Study Area
- Mean High Tide Line
- BCDC Jurisdiction

0 150 300 Feet

Image: Google 2008  
Data: DMJM Harris, AECOM



**Figure 5a:**  
**Special Status Species (Plants)**



**Accuracy Class 1**  
Reported occurrence is a point; location considered accurate to within the minimum mappable unit of 80 meters

**Accuracy Class 2**  
Reported location is an area with defined boundaries

**Accuracy Class 3**  
Reported location is a non-specific area; buffer added to represent degree of uncertainty in reported location

**Accuracy Class 4-9**  
Reported location considered accurate within the radius shown

**Study Area**





**Figure 5b:**  
**Special Status Species (Animals)**

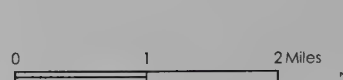


- Accuracy Class 1**  
Reported occurrence is a point; location considered accurate to within the minimum mappable unit of 80 meters
- Accuracy Class 2**  
Reported location is an area with defined boundaries
- Accuracy Class 3**  
Reported location is a non-specific area; buffer added to represent degree of uncertainty in reported location
- Accuracy Class 4-9**  
Reported location considered accurate within the radius shown
- Terrestrial Community (non-specific)**

- Study Area**
- Peregrine Falcon Nesting Site**
- Active Harbor Seal Haul Out Site**
- Burrowing Owl**

Source: CNDD8; October, 2008

SFOBB Bird Monitoring Memo, April, 2007;  
SFOBB Marine Mammal Monitoring Plan,  
May, 2002; Susan Euwing, personal  
communication, 2008



**Figure 6a: Alternative 4**  
**Impacts to Vegetation Communities and Aquatic Habitats**



**Vegetation Communities**

Central Coast Riparian Scrub (.028 ac)	Non-native Scrub/Shrubland (1.181 ac)
Eucalyptus Woodland (4.110 ac)	Northern Foredune (.440 ac)
Landscaped/Disturbed (3.788 ac)	Ruderal/Disturbed (1.065 ac)
Mixed Broadleaf Conifer Forest (3.326 ac)	Urban (19.615 ac)

**Study Area**



Figure 6b: Alternative 2b  
Impacts to Vegetation Communities and Aquatic Habitats



Vegetation Communities

- Central Coast Riparian Scrub (.028 ac)
- Eucalyptus Woodland (4.110 ac)
- Landscaped/Disturbed (3.788 ac)
- Mixed Broadleaf-Conifer Forest (3.326 ac)
- Nonnative Scrub/Shrubland (1.181 ac)
- Northern Foredune (.440 ac)
- Ruderal/Disturbed (1.065 ac)
- Urban (19.615 ac)

Study Area



Because of the recent Supreme Court decision in *Solid Waste Agency of Northern Cook County v. USACE (SWANCC)*, the USACE no longer takes jurisdiction over “isolated” wetlands and waters. The USACE does take jurisdiction over “adjacent wetlands,” which are hydrologically connected to navigable waters or tributaries of navigable water, even if such wetlands appear to otherwise be “isolated.” The Regional Water Quality Control Board (RWQCB) has authority over “waters of the State” under the Porter-Cologne Water Quality Control Act. In creek or river systems, RWQCB takes jurisdiction similar to California Department of Fish and Game (CDFG), from top of bank to top of bank. The RWQCB also asserts that it has authority over all wetlands, including isolated wetlands.

Any discharge of dredged or fill material into waters of the United States must be approved by the USACE pursuant to Section 404 of the CWA. Two permit types are possible:

1. Individual Permits; or
2. Nationwide Permits (NWP), which cover specific categories of activities. NWP are generally less time-consuming than an Individual Permit. NWP may be grouped together or “stacked” with certain limitations.

For linear transportation projects a standard Individual Permit is required if there are:

1. Discharges that will result in the fill of more than one-third acre of tidal waters or wetlands; or
2. Impacts to more than one-half acre of non-tidal waters or wetlands, including creeks (either perennial intermittent or ephemeral), arroyos or vegetated and unvegetated tributaries.

In contrast, such projects that result in impacts of less than one-half acre of non-tidal and/or less than one-third acre of non-tidal waters or wetlands may be authorized under one of the existing USACE NWP if they meet all of the NWP General Conditions.

#### *River and Harbors Act*

Under Section 10 of the Rivers and Harbors Act of 1899, the construction of structures in, over, or under, excavation of material from, or deposition of material

into “navigable waters” is regulated by USACE. Navigable waters of the United States are defined as those waters subject to the ebb and flow of the tide shoreward to the mean high-water mark or those that are currently used, have been used in the past, or may be used to transport interstate or foreign commerce. A Letter of Permission or permit from USACE is required before any work can be performed in navigable waters.

## **U.S. Fish and Wildlife Service**

### *Federal Endangered Species Act*

Section 9 of the Federal Endangered Species Act (FESA) prohibits “take” of federally listed threatened or endangered wildlife species (USFWS 1996, 1997, 2001, 2004). The FESA defines “take” to mean “harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or attempt to engage in any such conduct” 16 U.S.C. §1532(19). Federally listed plant species are not protected against “take” under the FESA. However, the FESA prohibits the removal and collection of endangered plants from lands under Federal jurisdiction. In addition, FESA prohibits the removal, cutting, digging, damage, or destruction of endangered plants on any other lands in knowing violation of state laws or regulations.

The FESA requires that actions authorized, funded or carried out by federal agencies do not jeopardize the continued existence of a federally listed species or adversely modify designated Critical Habitat (CH) for such species. If a federal agency determines that a proposed federal action (i.e., issuance of a CWA Section 404 permit for wetland fill) “may affect” a listed species and/or designated CH, the agency must consult with the USFWS and/or the National Oceanic and Atmospheric Administration – National Marine Fisheries Service (NOAA-Fisheries). If take of a federally listed species may occur, the applicant may be required to consult with the USFWS and obtain a Biological Opinion and Incidental Take Statement. Such take authorization is available through the Section 7 consultation process for projects involving a federal action, or through the Section 10 process (requiring development of a Habitat Conservation Plan (HCP) for other projects. The Incidental Take Statement allows taking of federally listed species if the take is “incidental to and not the purpose of, the carrying out of an otherwise lawful activity” 16 U.S.C. §1539(a)(1)(B). Formal consultation in a Section 7 is between the USFWS and/or NOAA-Fisheries and the lead federal agency, such as the Federal Highway

Administration (FHWA). FHWA, through NEPA delegation, has delegated Section 7 consultation to Caltrans for most projects.

As noted in the Endangered Species Consultation Handbook (USFWS and NMFS 1998), which was jointly prepared by the USFWS and NMFS and dated March 1998, Section 7 requires minimization of the level of take. It is not appropriate to require mitigation for the impacts of incidental take. In consulting with the Services for federally listed species, reasonable and prudent measures to minimize take of listed wildlife species may be required, consistent with the minor change rule. Reasonable and prudent measures can only include actions that occur within the action area, involve only minor changes to the project, and reduce the level of take of wildlife associated with project activities. These measures should minimize incidental take to the extent reasonable and prudent. Measures are considered reasonable and prudent when they are consistent with the proposed action's basic design, location, scope, duration, and timing. The test for reasonableness is whether the proposed measure would cause more than a minor change to the project.

#### *Migratory Bird Treaty Act*

The Migratory Bird Treaty Act (MBTA) is domestic legislation which serves to implement international agreements entered into with England, Mexico, Japan and the Former Soviet Union, to protect migratory bird species. The MBTA, as amended, prohibits killing, possessing, or trading in migratory birds except in accordance with regulations prescribed by the Secretary of the Interior. All birds, except European starlings, English house sparrows, rock doves (pigeons), and non-migratory game birds such as quail, pheasant, and grouse, are protected under the MBTA. This act applies to whole birds, parts of birds, and bird nests and eggs. The MBTA does not provide protection for habitat of migratory birds, but does prohibit the destruction or possession of individual birds, eggs, or nest in active use without a permit from USFWS.

#### *Marine Mammal Protection Act*

The Marine Mammal Protection Act (MMPA) of 1972 establishes a federal responsibility for the protection and conservation of marine mammal species by prohibiting the harassment, hunting, capture, or killing of any marine mammal. The primary authority for implementing the act belongs to the USFWS and NOAA-Fisheries.



### *Bald and Golden Eagle Protection Act*

The Bald and Golden Eagle Protection Act (Eagle Act), first enacted in 1940 and amended several times since then, prohibits the taking or possession of and commerce in bald and golden eagles, including their parts, nests, or eggs, with limited exceptions. The Eagle Act defines “take” as “pursue, shoot, shoot at, poison, wound, kill, capture, trap, collect, molest or disturb” (16 USC 668–668d). USFWS has defined “disturb” under the Eagle Act as follows (72 Federal Register [FR] 31132–31140, June 5, 2007):

Disturb means to agitate or bother a bald or golden eagle to a degree that causes, or is likely to cause, based on the best scientific information available, (1) injury to an eagle; (2) a decrease in its productivity, by substantially interfering with normal breeding, feeding, or sheltering behavior; or (3) nest abandonment, by substantially interfering with normal breeding, feeding, or sheltering behavior.

In addition to immediate impacts, this definition also covers impacts that result from human-induced alterations initiated around a previously used nest site during a time when eagles are not present, if, upon the eagle’s return, such alterations agitate or bother an eagle to a degree that injures an eagle or substantially interferes with normal breeding, feeding, or sheltering habits and causes, or is likely to cause, a loss of productivity or nest abandonment. USFWS has proposed new permit regulations to authorize the take of bald and golden eagles under the Eagle Act, generally when the take to be authorized is associated with otherwise lawful activities (72 FR 31141–31155, June 5, 2007). With the delisting of the bald eagle in 2007, the Eagle Act is the primary law protecting bald eagles, as well as golden eagles.

### **National Oceanic and Atmospheric Administration - National Marine Fisheries Service**

#### *Magnuson-Stevens Fishery Conservation and Management Act*

The Magnuson-Stevens Fishery Conservation and Management Act (MSFCMA) of 1976 applies to fisheries resources and fishing activities in federal waters within the 200 nautical miles offshore exclusive economic zone. Conservation and management of fisheries, development of domestic fisheries, and phasing out of foreign fishing activities are the main objectives of the legislation. When the MSFCMA was amended in 1996 to include habitat conservation issues, the designation of “essential

fish habitat” (EFH) was created. EFH is broadly defined by the MSFCMA as “those waters and substrate necessary to fish for spawning, breeding, feeding, or growth to maturity.”

### **California Department of Fish and Game**

#### *California Endangered Species Act*

Pursuant to the California Endangered Species Act (CESA) and Section 2081 of the Fish and Game Code, a permit from CDFG is required for projects that could result in the “take” of a species that is State listed as threatened or endangered (CDFG 2008b,c). Under CESA, “take” is defined as an activity that would directly or indirectly kill an individual of a species, but the definition does not include “harm” or “harass,” as the Federal act does. As a result, the threshold for take is higher under CESA than under FESA.

If a federal incidental take statement pursuant to a federal Section 7 consultation or a federal Section 10(a) incidental take permit has been issued for a project, a consistency determination (pursuant to Fish and Game Code 2080.1) can be made by CDFG for State listed species. In the case where CDFG determines the conditions of the federal opinion are consistent with CESA, CDFG will issue a letter documenting the consistency. If the CDFG determines the federal statement/permit is not consistent with CESA, the applicant must apply for a State Incidental Take Permit under section 2081(b) of the Fish and Game Code. In order for CDFG to make a consistency determination or issue a 2081 permit, the following criteria must be met:

1. The authorized take is incidental to an otherwise lawful activity;
2. The impacts of the authorized take are minimized and fully mitigated;
3. The measures required to minimize and fully mitigate the impacts of the authorized take:
  - a. are roughly proportional in extent to the impact of the taking on the species,
  - b. maintain the applicant's objectives to the greatest extent possible, and
  - c. are capable of successful implementation;
4. Adequate funding is provided to implement the required minimization and mitigation measures and to monitor compliance with and the effectiveness of the measures; and
5. Issuance of the permit will not jeopardize the continued existence of a State-listed species.

## *Fish and Game Code*

### Sections 1600-1607

The CDFG exercises jurisdiction over wetland and riparian resources associated with rivers, streams, and lakes under Fish and Game Code Sections 1600 to 1607. The CDFG has the authority to regulate work that will:

1. divert, obstruct, or change the natural flow of a river, stream, or lake;
2. change the bed, channel, or bank of a river, stream, or lake; or
3. use material from a streambed.

CDFG asserts that its jurisdictional area along a river, stream or creek is usually bounded by the top-of-bank or the outermost edges of riparian vegetation. Typical activities regulated by CDFG under Sections 1600-1607 authority include installing outfalls, stabilizing banks, creek restoration, implementing flood control projects, constructing river and stream crossings, diverting water, damming streams, gravel mining, logging operations and jack-and-boring.

### Sections 1900–1913

Sections 1900–1913 of the Fish and Game Code codify the Native Plant Protection Act (NPPA), which is intended to preserve, protect, and enhance endangered or rare native plants in the state. The act directs CDFG to establish criteria for determining which native plants are rare or endangered. Under Section 1901, a species is endangered when its prospects for survival and reproduction are in immediate jeopardy from one or more causes. A species is rare when, although not threatened with immediate extinction, it is in such small numbers throughout its range that it may become endangered if its present environment worsens. Under the act, the Fish and Game Commission may adopt regulations governing the taking, possessing, propagation, or sale of any endangered or rare native plant.

The California Native Plant Society (CNPS) has developed and maintains lists of plants of special concern in California as described above under “Special-Status Species.” CNPS-listed species have no formal legal protection, but the values and importance of these lists are widely recognized. Plants listed on CNPS Lists 1A, 1B, and 2 (CNPS 2008) meet the definitions of Section 1901 of the Fish and Game Code and may qualify for State listing. Therefore, for purposes of this analysis, they are considered rare plants pursuant to Section 15380 of CEQA.



### Sections 3503 and 3513—Protection of Birds

Section 3503 of the Fish and Game Code states that it is unlawful to take, possess, or needlessly destroy the nest or eggs of any bird. Section 3503.5 specifically states that it is unlawful to take, possess, or destroy any raptors (i.e., eagles, hawks, owls, and falcons), including their nests or eggs. Section 3513 provides for adoption of the MBTA's provisions. It states that it is unlawful to take or possess any migratory nongame bird as designated in the MBTA or any part of such migratory nongame bird. These State codes offer no statutory or regulatory mechanism for obtaining an incidental take permit for the loss of nongame, migratory birds. Typical violations include destruction of active raptor nests resulting from removal of vegetation in which the nests are located. Violation of Sections 3503.5 and 3513 could also include disturbance of nesting pairs that results in failure of an active raptor nest.

### Fully Protected Species under Fish and Game Code

Protection of fully protected species is described in four sections of the Fish and Game Code that list 37 fully protected species (Fish and Game Code Sections 3511, 4700, 5050, and 5515). These statutes prohibit take or possession at any time of fully protected species. CDFG is unable to authorize incidental take of fully protected species when activities are proposed in areas inhabited by those species. CDFG has informed non-Federal agencies and private parties that they must avoid "take" of any fully protected species in carrying out projects. The following special-status wildlife species known or with potential to occur in the BSA are fully protected species under the Fish and Game Code: American peregrine falcon (*Falco peregrinus anatum*) and white-tailed kite (*Elanus leucurus*; nesting).

### *California Department of Fish and Game Species Designations*

CDFG maintains an informal list of species called "species of special concern." These are broadly defined as plant and wildlife species that are of concern to CDFG because of population declines and restricted distributions and/or because they are associated with habitats that are declining in California. These species are listed in Remsen (1978), Williams (1986), and CDFG (2008c), and others are on a CDFG Watch List (CDFG 2008c) and are inventoried in the California Natural Diversity Database (CNDDDB) regardless of their legal status. Although California Species of Special Concern, CDFG Watch List species, and species that are tracked by the CNDDDB are afforded no official legal status, they may receive special consideration during the environmental review process.

## **San Francisco Bay Conservation and Development Commission**

### *McAteer-Petris Act*

The McAteer-Petris Act (MPA) protects Bay from indiscriminate filling. The MPA established the San Francisco Bay Conservation and Development Commission (BCDC) as the agency charged with preparing a plan for the long-term use of the Bay and regulating development in and around the Bay. BCDC's mission is dedicated to the protection and enhancement of Bay and to the encouragement of the Bay's responsible use. To this end, BCDC prepared the San Francisco Bay Plan (Bay Plan), which includes findings and policies on eight issues about the Bay as a resource and 21 findings and policies on development of the Bay and shoreline. In addition to the findings and policies, the Bay Plan contains maps that apply these policies to the Bay and shoreline. BCDC conducts the regulatory process in accord with the Bay Plan policies and maps, which guide the protection and development of the Bay and its tributary waterways, marshes, managed wetlands, salt ponds, and shoreline.

BCDC regulates filling and dredging in the Bay including San Pablo Bay, Suisun Bay, Suisun Marsh, and sloughs, and certain creeks and tributaries that are part of the Bay system. BCDC also has jurisdiction over a 100-foot shoreline band surrounding the Bay that extends from the mean high tide line inland. The Coastal Zone Management Act of 1972 (CZMA) requires that all applicants for federal permits and federal agency sponsors obtain certification from the state's approved coastal program that the proposed project is consistent with the state's program. In the Bay, BCDC is charged with making this consistency determination. The BCDC has given Yerba Buena Island a park priority use designation.

The build alternatives would not conflict with the BCDC park priority use designation as it would not affect public access within the 30.5 meter (100 foot) shoreline band. Water-oriented recreational facilities would continue to be accessible to the public and consistent with the BCDC's Bay Plan policies and park priority use designation.

## **Regional Water Quality Control Board**

### *CWA and Porter Colognes Water Quality Protection Act*

Pursuant to Section 401 of the CWA and EPA 404(b)(1) guidelines, a USACE federal permit applicant desiring to conduct any activity which may result in discharge into navigable waters, they must obtain a certification from RWQCB that

such discharge will comply with the state water quality standards. RWQCB has a policy of “no-net-loss” of wetlands and typically requires mitigation for all impacts to wetlands before it will issue water quality certification.

Under the Porter-Cologne Water Quality Control Act (Cal. Water Code §§13000-14920), RWQCB is authorized to regulate the discharge of waste that could affect the quality of the State’s waters. Therefore, even if a project does not require a federal permit (i.e., a NWP from the USACE), it may still require review and approval of RWQCB. In light of the approval of the new NWPs by the USACE on March 12, 2007 and the SWANCC decision. RWQCB, in response to this, issued guidance for regulation of discharges to “isolated” water on June 25, 2004. The guidance states:

Discharges subject to CWA section 404 receive a level of regulatory review and protection by the USACE and are also subject to streambed alteration agreements issued by the CDFG; whereas discharges to waters of the State subject to SWANCC receive no federal oversight and usually fall out of CDFG jurisdiction. Absent of RWQCB attention, such discharges will generally go entirely unregulated. Therefore, staffing constraints require RWQCB to regulate some dredge and fill discharges of similar extent, severity, and permanence to federally protected waters of similar value. Dredging, filling, or excavation of “isolated” waters constitutes a discharge of waste to Waters of the State, and prospective dischargers are required to submit a report of waste discharge to RWQCB and comply with other requirements of Porter-Cologne.

When reviewing applications, RWQCB focuses on ensuring that projects do not adversely affect the “beneficial uses” associated with waters of the State. Generally, RWQCB defines beneficial uses to include all of the resources, services and qualities of aquatic ecosystems and underground aquifers that benefit the State. In most cases, RWQCB seeks to protect these beneficial uses by requiring the integration of water quality control measures into projects that will result in discharge into waters of the State. For most construction projects, RWQCB requires the use of construction and post-construction Best Management Practices (BMPs).

To meet RWQCB standards for water quality protection as well as the broader jurisdiction generally asserted by them, it has become necessary to prepare a report addressing all hydrologic issues related to a project application. The report involves an analysis of pre-project watershed and water quality conditions (e.g., before and



after percent impervious surface analysis, before and after runoff analysis, design alternatives to address post-project changes in the watershed, and minimization of these changes BMPs). Additionally, the report should include a discussion of impacts to waters of the State and biological resources and how the project avoided those impacts to the maximum extent feasible, stressed minimization of impacts and proposed mitigation for unavoidable impacts.

### **California Environmental Quality Act**

#### *Guidelines Section 15380*

This section provides that a species not listed on the FESA or CESA may be considered rare or endangered under specific criteria. These criteria have been modeled after the definition in FESA and CESA. Section 15380 was included in the CEQA Guidelines primarily to deal with situations in which a public agency is reviewing a project that may have a significant effect on a candidate species that has not yet been listed by either USFWS or CDFG. Thus, Section 15380 provides an agency with the ability to protect a species from a project's potential impacts until the respective government agencies have an opportunity to designate the species as protected, if warranted.

An example would be the vascular plants listed as rare or endangered by the CNPS, but which may have no designated status or protection under FESA or CESA. The CNPS (CNPS 2008) created five lists:

- List 1A: Plants Presumed Extinct
- List 1B: Plants Rare, Threatened, or Endangered in California and elsewhere
- List 2: Plants Rare, Threatened, or Endangered in California, but more numerous elsewhere
- List 3: Plants About Which More Information is Needed – A Review List
- List 4: Plants of Limited Distribution – A Watch List

In general, plants appearing on CNPS List 1A, 1B, or 2 are considered to meet the criteria of Section 15380. Additional plant species that are locally or regionally rare are described for the Bay Area by local CNPS chapters and Lake (2004). Plants of

local concern and those listed on CNPS List 1A, 1B or List 2 meet the definition of NPPA and CESA.

### **Local Ordinances**

It is important to note, that Caltrans right-of-way is not subject to local land use regulations. In addition, based on the federal ownership of YBI, sovereign immunity applies to the project. The tree ordinance described below was nonetheless used as guidance in developing the project description which includes replacement of removed trees.

#### *San Francisco General Plan*

The San Francisco General Plan (SFGP) provides general policies and objectives to guide land use decisions. The Environmental Protection Element of the SFGP focuses on giving appropriate consideration to natural environment amenities and values while also giving consideration to economic and social issues. YBI is part of District 6 of the City and County of San Francisco, and as such is included in the scope of the SFGP. It is important to note, however, that Caltrans right-of-way is not subject to local land use regulations. Therefore, further analysis of the project's consistency with the SFGP in regard to biological resources is not included in this document.

#### *Significant Trees*

Per Ordinance 0017-06 "Public Works Code- Landmark Trees, Significant Trees, and penalties for Violations" and the San Francisco Department of Public Works Code Section 8.01-8.11, the City of San Francisco defines a significant tree as the following: (1) on property under the jurisdiction of the Department of Public Works or (2) on privately owned-property with any portion of its trunk within 10 feet of the public right-of-way, and (3) that satisfies at least one of the following criteria: (a) a diameter at breast height (DBH) in excess of twelve (12) inches, (b) a height in excess of twenty (20) feet, or (c) a canopy in excess of fifteen (15) feet. Tree removal requires an arborist survey to address the following:

c) As part of the Director's determination to authorize removal of a significant tree, the Director shall consider the following factors related to the tree;

- (1) Size, age, and species;

- (2) Visual and aesthetic characteristics, including the tree's form and whether it is a prominent landscape feature or part of a streetscape;
- (3) Cultural or historic characteristics, including whether the tree has significant ethnic appreciation or historical association or whether the tree was part of a historic planting program that defines neighborhood character;
- (4) Ecological characteristics, including whether the tree provides important wildlife habitat, is part of a group of interdependent trees, provides erosion control, or acts as a wind or sound barrier;
- (5) Locational characteristics, including whether the tree is in a high traffic area or low tree density area, or provides shade or other public benefits.

## 2.2. Studies Required

The SFOBB - East Span Seismic Safety Project Natural Environment Study (Woodward-Clyde 1998) included the YBI ramps project area within the YBI touchdown portion of the project area; however, an update of the biological resource evaluation was warranted for the current project given that the previous surveys were conducted more than 10 years ago and conditions may have changed since that time.

To assess the sensitivity of habitats on the project site, EDAW/AECOM (now AECOM) conducted a reconnaissance-level biological resources assessment and formal jurisdictional determination for the approximate 33.553 acre YBI Ramp Improvement BSA on YBI, located between PM 7.6 and 8.1 beginning at the east portal of the YBI tunnel at Macalla Road and ending before the SFOBB Transition Structure (Figure 2). The YBI Ramp Improvement BSA includes the portion of block 1939 lot 002 of San Francisco Assessors Volume #15 located on the northeastern extent of YBI, as depicted on the Oakland West USGS 7.5-minute topographic quadrangle. The BSA is based on the extent of potential permanent and temporary disturbance areas for Alternatives 2b and 4. Figure 2 depicts the limits of the BSA which includes the proposed project area alternatives and adjacent natural areas that may not be directly affected by the project but are in close enough proximity to warrant evaluation. Project features and activities are not proposed within the waters of the Bay. To adequately encompass habitats adjacent to the project disturbance area, upland areas up to the shoreline were included in the BSA (Figure 2a).



Additional surveys for potentially occurring special-status plants (Table 1) were conducted during the target species' blooming periods in spring/summer 2009. As described above, a tree survey was deemed unnecessary for the project as it is exempt from the City ordinances which apply to significant trees based upon the federal ownership of YBI (sovereign immunity) (Malamut 2009) and because the Caltrans right-of-way is not subject to local land use regulations.

### **2.3. Personnel and Survey Dates**

Consulting biologists Kristin Asmus (botanist and wetlands specialist), Angie Harbin-Ireland (senior wildlife biologist), Hildie Spautz (biologist), and Veronica Wunderlich (wildlife biologist) conducted a site reconnaissance of the project site on November 10, 2008 between the hours of 10:30 and 17:30. Temperatures during the site visit ranged from 55°F to 60°F, with winds from 0 – 10 mph blowing west-southwest.

The entire BSA was surveyed on foot and all distinct plant and wildlife habitats were described and mapped. Trees and shrubs were searched with binoculars for potential avian nest sites. Understory vegetation and open areas were surveyed for evidence of mammal activity, including potential woodrat houses and nests. Buildings and other structures were inspected for evidence of bat usage. Aquatic habitat characteristics were qualitatively assessed for their potential to support the various life history stages of aquatic species. All wildlife species observed or detected by sign were recorded. This report presents the results of the assessment and is intended to assist Caltrans in the review process for the YBI Improvement Project. The survey was intended as an evaluation of on-site habitat types and an assessment of the potential for occurrence of special-status plant and wildlife species, and does not include any species-specific focused surveys.

Concurrent with the site reconnaissance, EDAW biologists Kristin Asmus and Hildie Spautz conducted a wetland delineation and preliminary jurisdictional determination of the project site in accordance with the procedures outlined in the USACE Wetlands Delineation Manual (Environmental Laboratory 1987) and Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Arid West Region (USACE 2008). The entire BSA was surveyed on foot and all distinct plant communities were visited and described. Locations of potential wetlands and waters of the United States and State were recorded and mapped on a 1"=50' aerial map of the project area.

AECOM botanist Kristin Asmus and biologists Hildie Spautz and Josh Meidav performed focused botanical surveys on March 18, June 2, and August 19, 2009 (AECOM 2009).

During field surveys, the entire BSA was traversed on foot. All distinct upland and wetland plant communities were visited and described, and all plant species detected were identified and recorded. A complete plant species inventory for the BSA is presented in Appendix A. The entire BSA was surveyed during all seasons necessary for the detection and proper identification of any potentially occurring special-status plant species. Survey methods conformed to CDFG Guidelines for Assessing the Effects of Proposed Developments on Rare and Endangered Plants and Plant Communities (CDFG 2000) as well as the USFWS Guidelines for Conducting and Reporting Botanical Inventories for Federally Listed, Proposed and Candidate Plants (USFWS 2000).

#### **2.4. Agency Coordination and Professional Contacts**

Prior to conducting fieldwork, existing biological resource studies were reviewed for the project area, and adjacent project areas, as were CDFG, USFWS, and CNPS sensitive species occurrence databases. Information on special-status plant and animal species, as well as soils and wetlands, was compiled through a review of the following sources:

- Soil Survey of San Mateo County, Eastern Part, and San Francisco County, California (USDA 1991)
- Web Soil Survey (NRCS 2008)
- CNDDDB for the Oakland West and Briones Valley, Hunters Point, Oakland East, Oakland West, Richmond, San Francisco North, San Francisco South, San Leandro, and San Quentin 7.5-minute topographic quadrangles (CDFG 2008a)USFWS's Federal Endangered and Threatened Species that Occur in or may be Affected by Projects in the Oakland West and Eight Surrounding U.S.G.S. 7 1/2 Minute Quads and San Francisco County. Database Last Updated: April 29, 2010. Document Number: 100624034334. (USFWS 2010).USFWS's Endangered and Threatened Wildlife and Plants (USFWS 1998, 2008).
- CDFG's *State and Federally Listed Endangered and Threatened Animals of California* (CDFG 2008b) and *Special Animals List* (CDFG 2008c)

- CNPS's *Inventory of Rare and Endangered Plants of California* (CNPS 2001, 2008)
- CDFG's *Special Vascular Plants, Bryophytes, and Lichens List* (CDFG 2009a), *Changes to Special Vascular Plants, Bryophytes, and Lichens List* (CDFG 2009b) and *State and Federally Listed Endangered, Threatened, and Rare Plants of California* (CDFG 2009c)
- *Yerba Buena Chapter Rare Plant List – Presidio and San Francisco* (CNPS 2005a, 2005b)
- *Angel Island Native Plant Checklist* (CNPS 1993)
- *Rare Plants of San Francisco. List of Special Status Plants of the Presidio. Yerba Buena Chapter* (CNPS 2005a)
- *Unusual and Significant Plants of Alameda and Contra Costa Counties* (Lake 2004)
- *Distribution and Ecology of Stream Fishes in the San Francisco Bay Drainage* (Leidy 1984)

Additional documents prepared for the area and adjacent projects were reviewed:

- *Special Status Plant Survey and Habitat Assessment for Naval Station Treasure Island, Yerba Buena Island, California* (Wood 1996)
- *Preliminary Checklist of the Flora of Yerba Buena Island, San Francisco County* (Wood Biological Consulting 2007)
- *Hidden in Plain Sight: The Treasure of Yerba Buena Island* (Wood 2008)
- *San Francisco Oakland Bay Bridge - East Span Seismic Safety Project Natural Environment Study* (Woodward-Clyde 1998)
- *San Francisco Oakland Bay Bridge - East Span Seismic Safety Project Final Environmental Impact Statement/Statutory Exemption and Final Section 4(f) Evaluation* (USDT - FHWA 2001)
- *Treasure Island Ferry Terminal Location Study* (Concept Marine Associates 2003)



- *Final Natural Environment Study: Doyle Drive, South Access to the Golden Gate Bridge* (ESA 2005)
- *Yerba Buena Island Habitat Management Plan – Stakeholder Interview Background Information. And Appendix – Existing Habitats and Special-Status Species on Yerba Buena Island* (Garcia and Associates 2008)
- *Transfer and Reuse of Naval Station Treasure Island: Final Environmental Impact Report Vol 1: Chapters 1 to 10* (San Francisco Planning Department 2006)
- *Marine Mammal Monitoring Plan: San Francisco – Oakland Bay Bridge East Span Seismic Safety Project* (Parsons Brinckerhoff 2002)
- *Revised Marine Mammal Monitoring Plan: San Francisco – Oakland Bay Bridge East Span Seismic Safety Project* (SRS Technologies 2004)
- *Final Preliminary Bird Monitoring Protocol: San Francisco – Oakland Bay Bridge East Span Seismic Safety Project* (LSA 2002)
- *San Francisco-Oakland Bay Bridge East Span Seismic Safety Project Fisheries and Hydroacoustic Monitoring Program - Work Plan* (Strategic Environmental 2002)
- *YBI Ramp Improvements – PEAR* (EDAW 2007)
- *USCG Bridge Permit – Proposed San Francisco Oakland Bay Bridge Replacement East of the Yerba Buena Island.* (USCG 2001)
- *Distribution and Ecology of Stream Fishes in the San Francisco Bay Drainage.* (Leidy, R.A. 1984)

The SFCTA is submitting a request for verification of USACE jurisdiction. USACE conducted a preliminary review of photos and the jurisdictional determination map and indicated via e-mail correspondence on January 4<sup>th</sup>, 2011, that several of the unvegetated waters features appear to have been constructed in uplands, drain only uplands, and are therefore not jurisdictional. However, USACE stated that the remaining features may fall under their jurisdiction as natural ephemeral drainages.

If jurisdiction is confirmed and impacts are at threshold where notification or permits are necessary the appropriate notifications and/or applications (e.g., 404 CWA permit

from USACE and 401 Certification from RWQCB) would be submitted. It is anticipated the project would qualify under NWP 14 (Linear Transportation Projects) given minimal potentially jurisdictional acreage within the BSA.

## **2.5. Limitations That May Influence Results**

While the studies employed in this investigation were designed to give a comprehensive overview of the biological resources found within the BSA, no focused surveys for wildlife were conducted during this survey effort. As such, the methods employed would not necessarily rule out some special-status species. However, based on the surveys conducted to date, an assessment of habitats on the site, and populations in the region, certain special-status animal species are not expected to occur or can be entirely ruled out. Surveys for special-status plant species were conducted and those results are included herein. As described in Section 2.3 a tree inventory is not required for the BSA, thus size data is not provided in this report.

Botanical nomenclature used throughout this report conforms to Hickman (1993) except for recent changes in circumscriptions in the family Asteraceae (Baldwin 1999), and other recent changes in nomenclature. Plant community names conform to Holland (1986) and Sawyer and Keeler-Wolf (1995) where applicable; wetland community names conforming to Cowardin et al. (1979) are also given where appropriate. Nomenclature for special-status plant species conforms to the CDFG (CDFG 2009c) and the CNPS (CNPS 2001, 2008). Nomenclature for sensitive natural communities conforms to the CDFG (CDFG 2003, Holland 1986). Nomenclature for wildlife conforms to Sibley (2003) for birds, Stebbins (2003) for reptiles and amphibians, and Jameson Jr. and Peeters (2004) for mammals.

## **Chapter 3. Results: Environmental Setting**

### **3.1. Description of the Existing Biological and Physical Conditions**

YBI is an approximately 577-acre natural island located between San Francisco and Oakland in the Bay (Figure 1). The island has been known by several different names including Seabird Island, Wood Island, and Goat Island, but was officially named as YBI in 1850 when it was included in the formal boundaries of San Francisco County. While the island was used for non-military purposes including the raising of goats and placement of a lighthouse for maritime navigation, the island has also been used for military purposes throughout its more recent history. YBI was used as a military post during the Civil War era and became a U.S. Naval training station in the early 20<sup>th</sup> century (Boyes 1936). While the training station was closed in 1916, portions of the island continued to fall under U.S. Navy (USN) control on and off until 1993 (NPS 2009), when Treasure Island, which was constructed immediately adjacent to YBI, and the portions of YBI that were under the jurisdiction of the USN were decommissioned. In addition to the USN facilities, a USCG facility was established in 1939 on the southwest side of the island, and remains active to this day. Because of the long history of military and civilian use of the island, including the harvesting of native trees and large number of goats that were kept on the island, the natural habitats found on the island are generally disturbed. Despite the disturbed nature of the communities on-site, however, there is potential for some sensitive plant and wildlife species to occur within the BSA, located on the northern end of the island. The BSA is discussed in more detail below.

#### **3.1.1. BSA**

The BSA, located within the Oakland West 7.5' USGS Quadrangle, encompasses the northeastern tip of YBI, from the first dry structural footing for the west side of the eastern span of the SFOBB, to the eastern YBI tunnel entrance, and borders active USCG facilities to the south, the Bay to the north and east, and the YBI tunnel, former USN Station structures, and current residential development to the west (Figure 2). Current construction activities, as well as associated trailers and staging areas, for the SFOBB East Span Seismic Safety Project are ongoing on the eastern side of the BSA, and as such a large portion of the BSA is currently characterized by active construction, and is largely unvegetated (Figure 4). The western portion of the BSA is a mixture of landscaped and developed areas, roadways, and disturbed natural



communities. These communities are described in detail in section 4.1 and are depicted on Figure 4.

### **3.1.2. Physical Conditions**

The BSA ranges in elevation from 5 feet above mean sea level near the water's edge on the eastern border of the site, to as high as 230 feet above mean sea level near the tunnel entrance at the western border of the site. The slopes range from moderate to steep, with very steep embankments characterizing the north edge of the BSA (Figure 2b). The BSA consists of approximately 35 percent Candlestick-Kron-Buriburi complex soils (hard-fractured residuum weathered from sandstone) on the slopes, with the remainder consisting of orthents (recently eroded soils with virtually no diagnostic horizons) and urban land, much of which is fill (NRCS 2008).

The climate at Yerba Buena Island, like much of California, is characterized by a Mediterranean climate with mild, wet winters and dry summers. The climate at Yerba Buena Island is heavily influenced by the cool temperatures of San Francisco Bay which moderates temperature swings. Most rain falls from October-April, with a yearly average of 20 inches (51 cm). Yearly average high temperatures hover around 63 degrees Fahrenheit (17 degrees Celsius), with peak temperatures occurring in September and low temperatures occurring in January. Fog, a ubiquitous constant within the San Francisco Bay Area, may blanket Yerba Buena Island often, especially in the morning before ambient temperatures have risen. The steep topography of Yerba Buena Island has helped to create diverse micro-climates and hence micro-habitats.

### **3.1.3. Biological Conditions in the BSA**

Vegetation communities and wildlife habitats within the BSA on YBI can generally be described as a mosaic of nonnative ornamental and invasive vegetation with relatively small patches of remnant native species (Figure 4). Vegetation communities found on-site are eucalyptus woodland (4.110 acres), mixed broadleaf-conifer forest (3.326 acres), nonnative scrub/shrubland (1.181 acres), northern foredune (0.440 acre), central coast riparian scrub (0.028 acre), landscaped/disturbed (3.788 acres), and ruderal/disturbed (1.065 acres) as presented in the Table 1 below and, Figure 4. The majority of the site has been disturbed and developed and consists of urban hardscape land and bare ground (paved roads, buildings, parking lots, and construction areas) totaling 19.615 acres. The developed area is currently being used for construction of the SFOBB. Remnant patches of native communities found within

the larger communities are northern (Franciscan) coastal scrub, northern coastal bluff scrub, and Coast live oak woodland. These remnant patches were not discretely mapped due to lack of functional value. Each of the dominant vegetation communities is described separately below (Table 1), and includes descriptions of the native elements found therein.

**Table 1. Habitat Type and Area**

Habitat Type	Total Area
Eucalyptus Woodland	4.110 acres
Mixed Broadleaf-Conifer Forest	3.326 acres
Nonnative Scrub/Shrubland	1.181 acres
Northern Foredune	0.440 acre
Central Coast Riparian Scrub	0.028 acre
Landscaped/Disturbed	3.788 acres
Ruderal/Disturbed	1.065 acres
Urban	19.615 acres

### **Eucalyptus Woodland**

Eucalyptus woodland has naturalized in California since eucalyptus trees were first brought to the state in the mid 1880s. Numerous species of the genus were imported for their horticultural interest and their potential utility as a fast-growing hardwood. Because climatic conditions in the western half of the state are very similar to the range of many of the imported species of eucalyptus in Australia, the planted groves managed to persist and spread without cultivation. It is estimated that there are between 600 and 800 species of eucalyptus, about 18 of which have become fairly widespread in California. The most common and widely grown species is Tasmanian blue gum (*Eucalyptus globulus*), which is the dominant species in the BSA. Because

the so-called gum trees form dense, expanding groves, drop a tremendous amount of bark and leaf litter, and greatly alter the chemistry of the soil, eucalyptus have contributed to the loss of native plant communities which typically cannot persist in the understory. Eucalyptus has had an especially adverse effect on native coastal scrub and coast grassland communities and often presents a fire hazard.

Eucalyptus woodlands totaling approximately 4,110 acres are located within the BSA. The canopy is dominated by Tasmanian blue gum trees 40 - 60 feet in height. The understory mostly supports ruderal, nonnative shrubs and herbs such as broom (*Genista* spp.), English ivy (*Hedera helix*), and Himalayan blackberry (*Rubus discolor*). Gaps and edges of these stands are dominated by ornamental nonnative trees, including blackwood acacia (*Acacia melanoxylon*) and a few native understory species, including wild lilac (*Ceanothus* spp., including planted horticultural varieties) and snowberry (*Symphoricarpos albus*), among others. This community intergrades with mixed broadleaf-conifer forest. Eucalyptus woodland is not defined in Holland (1986). On-site, eucalyptus woodland conforms to the eucalyptus series as described in Sawyer and Keeler-Wolf (1995) and would be classified as an upland following Cowardin, et al. (1979).

Eucalyptus woodland provides cover and nesting habitat for a variety of birds and overwintering habitat for the monarch butterfly (*Danaus plexippus*). Large

(e.g. > 9") diameter trees may provide nesting habitat for raptors, including great horned owl (*Bubo virginianus*), red-tailed hawk (*Buteo jamaicensis*), and red-shouldered hawk (*Buteo lineatus*). A variety of passerine species can be expected to occur and nest in this habitat such as Anna's hummingbird (*Calypte anna*), white-crowned sparrow (*Zonotrichia leucophrys*), song sparrow (*Melospiza melodia*), and house finch (*Carpodacus mexicanus*).

### **Mixed Broadleaf-Conifer Forest**

Mixed broadleaf-conifer forest is a general description for a vegetation community dominated by both conifers and broadleaf trees (non-conifers, either deciduous or non-deciduous). In coastal central California, native mixed broadleaf-conifer forests include mixed evergreen forest dominated by Douglas fir (*Pseudotsuga mensesii*) and coast live oak (*Quercus agrifolia*); and Monterey pine forest, which includes Monterey pine (*Pinus radiata*), coast live oak, and native understory shrub and ground cover species also found in coast live oak forests.



Within the BSA, mixed broadleaf-conifer forest totals approximately 3.326 acres and is characterized by Monterey pine, Monterey cypress (*Callitropsis macrocarpa*), and coast live oak with other nonnative trees such as Tasmanian blue gum, blackwood acacia and Victorian box (*Pittosporum undulatum*). The understory is dominated by brooms (*Genista* and *Cytisus* spp.), English ivy, Himalayan blackberry, and periwinkle (*Vinca major*). Small patches of native species associated with remnant coast live oak woodland persist in the understory and include coyote brush (*Baccharis pilularis*), snowberry, poison oak (*Toxicodendron diversilobum*), toyon (*Heteromeles arbutifolia*), and blue elderberry (*Sambucus mexicana*). Herbaceous understory species that were observed include native miner's lettuce (*Claytonia perfoliata*), California blackberry (*Rubus ursinus*), and nonnative smilo grass (*Piptatherum miliaceum*). This community intergrades with eucalyptus, landscaped/disturbed, and ruderal/disturbed, and as such wildlife species associated with this habitat would be similar to those found in those habitats as discussed in this section.

Mixed broadleaf conifer forest is not defined in Holland (1986). On-site, mixed broadleaf conifer forest resembles a combination of Monterey pine series, eucalyptus series, and coast live oak series as described in Sawyer and Keeler-Wolf (1995) and would be classified as an upland following Cowardin, *et al.* (1979).

### **Nonnative Scrub/Shrubland**

Non-native scrub/shrubland is a general term for a vegetation community dominated by nonnative shrubs. These shrub communities may be early seral (i.e., developing after disturbance has completely removed pre-existing vegetation) or may have developed by a gradual invasion and replacement of native vegetation, often by nonnative, invasive, and naturalized garden escapee species such as French broom (*Genista monspessulana*). Plants in this community are adapted to site conditions similar to the native communities they replaced, e.g., dry and exposed slopes with shallow soils, and the community typically includes a low woody shrub layer and a mixture of perennial and annual herbaceous ground cover. There may also be native plant species present, and these species may be remnant representatives of the natural communities present prior to disturbance and/or invasion by nonnative plants, or native invasive species not typically found in the region.

On-site nonnative scrub/shrubland encompasses approximately 1.181 acres of the BSA and contains remnant elements of northern (Franciscan) coastal scrub and northern coastal bluff scrub. Northern (Franciscan) coastal scrub consists of a dense

cover of low shrubs up to six feet high with a well-developed herbaceous or low woody understory. Northern (Franciscan) coastal scrub is most extensive on windy, exposed sites with shallow, rocky soils. Northern coastal bluff scrub is comprised of low, often prostrate scrub species two to 20 inches high and forming continuous or scattered mats. It is made up of dwarf shrubs, herbaceous perennials, and annuals and, occasionally, succulent species. This plant community develops on exposed coastal bluffs above the high tide line and is subject to strong winds and salt spray. Soils are usually rocky and poorly developed (Holland 1986).

Within the BSA, nonnative scrub/shrubland is dominated by sweet fennel (*Foeniculum vulgare*) and brooms, with primarily nonnative ground cover herbaceous and grass species, including mustard (*Brassica* spp.), cheeseweed (*Malva parviflora*), and smilo grass. The nonnative shrub community intergrades in some places with eucalyptus woodland and landscaped/disturbed, and differs from these communities by the relatively higher proportion of shrubs and the absence of a tall tree canopy.

Elements of northern (Franciscan) coastal scrub occur on the exposed rocky slopes found on the most northeastern point of the island beneath the existing east span of the SFOBB (this area was identified as northern coastal scrub in the Final Environmental Impact Report ([FEIR]; SFPD 2006). Characteristic species present include or may include poison oak, toyon, California broom (*Lotus scoparius*), oso berry (*Oemleria cerasiformis*), western bracken fern (*Pteridium aquilinum* var. *pubescens*), blue elderberry, bee plant (*Scrophularia californica*), and blue-eyed grass (*Sisyrinchium bellum*) among others. Within the BSA, northern coastal bluff scrub elements also occur on the bluffs beneath the existing eastern span of the SFOBB, on the northeastern-most point of the island. Characteristic species with potential to be present in this habitat include seaside daisy (*Erigeron glaucus*), bluff lettuce (*Dudleya farinosa*), bentgrass (*Agrostis* spp.), and yarrow (*Achillea millefolium*), among others.

Nonnative scrub/shrubland is not defined in Holland (1986). Nonnative scrub/shrubland as found on-site corresponds most closely to the Broom series as classified by Sawyer and Keeler-Wolf (1995). The northern (Franciscan) coastal scrub Holland type corresponds to the coyote brush series as classified by Sawyer and Keeler-Wolf (1995). The northern coastal bluff scrub Holland type as found on-site does not correspond to any particular series as described by Sawyer and Keeler-Wolf (1995). Nonnative scrub/shrubland would be classified as upland (non-wetland) following Cowardin *et al.* (1979).

Scrub communities, interspersed with other habitats such as those on-site, provide foraging and nesting habitat for bird species that are attracted to edges of communities, including California quail (*Callipepla californica*), white-crowned sparrow, and California towhee (*Pipilo crissalis*), among others. These species forage among the leaf litter for invertebrates. Avian species that use the canopy of scrub for catching insects includes white-crowned sparrow and wrentit (*Chamaea fasciata*). Besides creating habitat for insect prey, flowering scrub vegetation provides nectar for bird species such as Anna's hummingbird.

Mammals, including striped skunk (*Mephitis mephitis*), use this habitat for protection and foraging grounds, feeding off new shoots of plants. Mule (black-tailed) deer (*Odocoileus hemionus*) often feed in scrubs but this habitat supports a lower density of deer than oak savannahs. Small mammals that are expected to occur within the scrub include brush rabbits (*Sylvilagus bachmani*), Botta's pocket gophers (*Thomomys bottae*), and deer mice (*Peromyscus maniculatus*). Small mammals attract predators such as hawks owls, and coyotes (*Canis latrans*).

### **Northern Foredune**

Northern foredune is generally found behind active beaches and in front of more stabilized back dune coastal scrubs. This plant community is similar to active coastal dunes but is somewhat more sheltered from wind and may have a greater supply of groundwater. This zone is also referred to as coastal strand vegetation. This pioneer habitat typically has low species diversity, being dominated by prostrate herbs and grasses with creeping stems or rhizomes. These salt tolerant plants are also tolerant of repeated burial by shifting sands and contribute to dune stabilization. Northern foredune vegetation occurs in areas of sand accumulation along the immediate coast from Monterey County to Oregon (Holland 1986).

Within the BSA, a narrow 0.440 acre strip of northern foredune vegetation occurs along the northwestern portion of the site. In addition there is an approximately 5-meter (15 foot) wide patch of invasive, nonnative *Spartina alterniflora* hybrid on the northeastern portion of the site, north of the SFOBB. This species is more typical of northern coastal salt marsh but its invasive nature warrants mention here. The patch was treated with herbicide by the Invasive *Spartina* Project in September 2008 (Hogel 2008). Wave action in the BSA appears to be too strong to allow substantial northern coastal salt marsh vegetation to develop.



The northern foredune vegetation on-site is dominated by nonnative iceplant (*Carpobrotus edulis*) and sweet fennel. Diagnostic foredune species present include sea rocket (*Cakile maritima*) and iceplant, although additional species may be present and observable during other seasons. Native species observed include alkali heath (*Frankenia salina*), saltgrass (*Distichlis spicata*), and spearscale (*Atriplex triangularis*). Other nonnative species present include cheeseweed, dill daisy (*Argyranthemum* sp.), Russian thistle (*Salsola soda*), and seedlings of wild radish (*Raphanus sativa*). Wood's plant list (2007) indicates that other foredune species are present on the island, including several special-status species, but these have been primarily documented on the less-disturbed western portion of YBI. These species include dune gilia (*Gilia capitata* ssp. *capitata*, CNPS 1B.1), woolly-sunflower (*Eriophyllum staechadifolium*), yellow bush lupine (*Lupinus arboreus*), and beach bursage (*Ambrosia chamissonis*).

Within the BSA, northern foredune most closely corresponds to the iceplant series as classified by Sawyer and Keeler-Wolf (1995) and is upland following Cowardin *et al.* (1979). Northern foredune habitat in undisturbed areas such as outer Point Reyes is used for nesting and foraging by several bird species including western snowy plover (*Charadrius alexandrinus nivosus*), federally listed Threatened, and a California Species of Special Concern. However, remnant small patches of northern foredune habitat such as that found on-site are unlikely to be used for nesting by most avian species, due to the prevalence of iceplant and lack of sandy dunes. These patches are more likely to be used only for foraging and roosting by shorebirds and waterbirds, particularly gulls (*Larus* spp.), and generalist landbirds nesting in other habitats nearby.

### Central Coast Riparian Scrub

Central coast riparian scrub typically consists of a scrubby streamside, with open to impenetrable thickets composed of any of several species of willows (*Salix* spp). This plant community occurs close to river channels and near the coast on fine-grained sand and gravel bars with a high water table. It is distributed along and at the mouths of most perennial and many intermittent streams of the southern coast ranges, from the Bay Area to near Point Conception (Holland 1986). Central coast riparian scrub is generally regarded as early seral, meaning that it typically precedes the development of other riparian woodland or forest communities in the absence of severe flooding. However, outside of riparian situations, that is, near groundwater seeps, willow-

dominated scrub represents a relatively stable plant community and is not considered seral.

Within the BSA, an approximate 0.028 acres patch of central coast riparian scrub occurs at the southern end of the northern foredune community where a culvert empties into the bay. A patch of vegetation referred to as riparian scrub was also noted in SFOBB FEIR (SFPD 2006) in this area. The sole species occurring in the BSA is arroyo willow (*Salix lasiolepis*). This species generally indicates the presence of fresh water. On-site, central coast riparian scrub conforms to the arroyo willow series as described in Sawyer and Keeler-Wolf (1995) and palustrine shrub-scrub wetland following Cowardin *et al.* (1979).

Wildlife species found in central coast riparian scrub would be similar to that found in other scrub communities as noted above. Additionally, the thick stands of willow species that characterize central coast riparian scrub habitat provides cover and nesting habitat for a variety of birds, including white-crowned sparrow, song sparrow, and house finch.

### **Landscaped/Disturbed**

Landscaped lands are disturbed in that all or most of the native vegetation has been removed and replaced with horticultural species. Disturbed landscaped areas have little potential to support significant botanical resources.

Landscaped/disturbed lands within the BSA totaling approximately 3.788 acres surround residential buildings and paved areas. Such areas are not expected to support any naturally occurring vegetation, although invasive native and nonnative plant species frequently colonize disturbed sites. Ornamental species found within the BSA include cheesewood (*Pittosporum* spp.), cotoneaster (*Cotoneaster* spp.), shrub roses (*Rosa* spp.), Indian hawthorn (*Raphiolepis indica*), juniper (*Juniperus* spp.), English ivy, and butterfly bush (*Buddleja davidii*), among others. Several native species were planted in the landscaped areas as well, including wild lilac, western red cedar (*Thuja plicata*), Monterey cypress, and Monterey pine. These tree species are also included in the areas described as mixed broadleaf conifer forest, above, where they contribute to a continuous canopy. Landscaped/disturbed lands as they occur on-site are not specifically described by Sawyer and Keeler-Wolf (1995) and would be classified as upland following Cowardin *et al.* (1979).

Wildlife species associated with landscaped/disturbed lands are often those often associated with close contact to urban areas such as raccoon (*Procyon lotor*), opossum (*Didelphus virginianus*), house finch, European starling (*Sturnus vulgaris*), and mourning dove (*Zenaida macroura*).

### **Ruderal/Disturbed**

Ruderal/disturbed vegetation is typical of disturbed lands on which the native vegetation has been completely removed by human activities such as grading, disking, cultivation, or other surface disturbances. Disturbed areas, if left undeveloped, may become recolonized by exotic species as well as native species. Native vegetation may ultimately become at least partially restored if the soils are left intact and there is no further disturbance. Ruderal vegetation comprises approximately 1.065 acre of the BSA and is scattered throughout the site in disturbed areas, including areas that have been graded, are adjacent to construction, on which there is limited regular vehicle traffic, and along the edges of roads.

Ruderal vegetation on-site characteristically supports nonnative annual grasses and forbs typical of local nonnative annual grassland. Plant species likely to be found on-site and which would be classified as ruderal include nonnative species such as sweet fennel, black mustard (*Brassica nigra*), and wild radish. Common nonnative grasses and forbs that are likely to be present but were not apparent during the fall 2008 visit include Italian ryegrass (*Lolium multiflorum*), rip-gut brome (*Bromus diandrus*), soft chess (*Bromus hordeaceus*), little quaking grass (*Briza minor*), bur-clover (*Medicago polymorpha*), prickly ox-tongue (*Picris echioides*), and common vetch (*Vicia sativa*), all of which have been previously identified on YBI (Wood Biological Consulting 2007). Ruderal vegetation as it occurs on-site is not specifically described by Sawyer and Keeler-Wolf (1995), although portions of it conform to the California annual grassland series. Ruderal vegetation on-site would be classified as upland following Cowardin *et al.* (1979).

Wildlife species generally associated with disturbed ruderal lands include raccoon, opossum, European starling, and mourning dove. Killdeer (*Charadrius vociferus*) are also often associated with open disturbed substrates. Wildlife species that feed on seeds or other parts of the vegetation, including finches, goldfinches, sparrows, and a variety of rodents, occur in this habitat type. Insects present in disturbed habitats provide food for species such as western meadowlark (*Sturnella neglecta*),



blackbirds, loggerhead shrike (*Lanius ludovicianus*), and western fence lizard (*Sceloporus occidentalis*). This community can support a variety of predators, including snakes, various raptors, red fox (*Vulpes vulpes*) and coyote.

### **Aquatic Features**

No evidence of wetlands was found in the BSA. Aquatic habitats on-site consist solely of unvegetated waters flowing in concreted or roadside swales totaling 0.04 acre (1,852 square feet) (Figure 4). When water is present, they may provide drinking water for wildlife and refuge for common amphibian species, such as pacific tree frog (*Hyla regilla*). The waters of the Bay are just beyond the boundary of the BSA (Figure 4).

### **Climate**

From the California Data Exchange Center (<http://cdec.water.ca.gov/>), the San Francisco West Bay station (SF WB AP) has recorded yearly precipitation values of 19.9" and a monthly average of 1.66" with peak in January (4.41") and a low in July (0.03"). Most rain (96%) falls within the months of October-April, indicative of a Mediterranean climate characterized by cool, wet winters and warm, dry summers. Average temperature is 60 degrees Fahrenheit (<http://www.weatherbase.com/>).

## **3.2. Regional Species and Habitats of Concern**

Habitats identified above that are of special concern are northern foredune, central coast riparian scrub, and aquatic features. Special-status species with potential to occur within the BSA are identified in Table 2. For the purpose of this document, special-status species are plant and wildlife species that are legally protected under the FESA, CESA, or other State regulations, and species that are considered sufficiently rare by the scientific community to warrant conservation concern. Several special-status species which occur in the region or vicinity of the site are not expected to be present due to a lack of suitable habitat or connectivity to known populations. The BSA boundary does not extend into the Bay and aquatic habitats on-site are limited consisting of roadside swales. The active construction staging areas and historic disturbance of vegetation on-site have diminished the habitat quality on this portion of YBI. All species considered as part of this analysis and their habitat requirements are listed in Appendix A for wildlife and Appendix B for plants. Appendix C provides a list of special-status species reported to the CNDDDB for the U.S. Geological Survey (USGS) Oakland West quadrangle and 8 surrounding

quadrangles (San Quentin, Richmond, Briones Valley, San Francisco North, Oakland East, San Francisco South, Hunter's Point, and San Leandro). Figures 5a and 5b show locations of sensitive biological resources within approximately five miles of the BSA. Appendix D presents a list provided by USFWS of special-status species reported in the area covered by the above listed USGS quadrangles. A full discussion of sensitive natural communities and sensitive species with some potential for occurrence within the BSA is provided in Chapter 4.

**Table 2: Listed, Proposed Species, and Critical Habitat Potentially Occurring or Known to Occur in the Project Area.**

Common Name	Scientific Name	Status	Habitat Present/Absent	Potential for Occurrence and Rationale
<b>Plants</b>				
Coast rock cress	<i>Arabis blepharophylla</i>	CNPS 4; YBC	HP	Low: Marginally suitable scrub habitat present. Would have been detectable during focused surveys – presumed absent.
Nuttall's milk-vetch	<i>Astragalus nuttallii</i> var.	CNPS 4.2	HP	Very Low: Marginally suitable habitat present. Would have been detectable.
Coastal bluff morning-glory	<i>Calystegia purpurata</i> ssp. <i>saxicola</i>	CNPS 1B.2	HP	Moderate: Marginally suitable habitat present. Would have been detectable during focused surveys – presumed absent.
Franciscan thistle	<i>Cirsium andrewsii</i>	CNPS 1B.2; YBC	HP	Low: Marginally suitable habitat present. Would have been detectable during focused surveys – presumed absent.
Compact cobwebby thistle	<i>Cirsium occidentale</i> var. <i>compactum</i>	CNPS 1B.2	HP	Very Low: Marginally suitable habitat present. Would have been detectable during focused surveys – presumed absent.
San Francisco Bay spineflower	<i>Chorizanthe cuspidata</i> var. <i>cuspidata</i>	CNPS 1B.2; YBC	HP	Low: Marginally suitable habitat present. Would have been detectable during focused surveys – presumed absent.
Robust spineflower	<i>Chorizanthe robusta</i> var. <i>robusta</i>	FE; CNPS 1B.1	HP	Very Low: Marginally suitable habitat present. Would have been detectable during focused surveys – presumed absent.
San Francisco collinsia	<i>Collinsia multicolor</i>	CNPS 1B.2; YBC	HP	Low: Marginally suitable habitat present. Would have been detectable during focused surveys – presumed absent.
Pt. Reyes bird's-beak	<i>Cordylanthus maritimus</i> ssp. <i>palustris</i>	CNPS 1B.2; YBC	HP	Low: Marginally suitable habitat present. Would have been detectable during focused surveys – presumed absent.
Western leatherwood	<i>Dirca occidentalis</i>	CNPS 1B.2	HP	Low: Marginally suitable habitat present. Would have been detectable during focused surveys – presumed absent.



Common Name	Scientific Name	Status	Habitat Present/Absent	Potential for Occurrence and Rationale
San Francisco wallflower	<i>Erysimum franciscanum</i>	CNPS 4.2; YBC	HP	Low: Marginally suitable habitat present. Would have been detectable during focused surveys – presumed absent.
Fragrant fritillary	<i>Fritillaria liliacea</i>	CNPS 1B.2	HP	Low: Marginally suitable habitat present. Would have been detectable during focused surveys – presumed absent.
Dune gilia	<i>Gilia capitata</i> ssp. <i>chamissonis</i>	CNPS 1B.1; YBC	HP	Moderate: Marginally suitable habitat present. Would have been detectable during focused surveys – presumed absent.
Dark-eyed gilia	<i>Gilia millefoliata</i>	CNPS 1B.2	HP	Very Low: Marginally suitable habitat present. Would have been detectable during focused surveys – presumed absent.
San Francisco gum-plant	<i>Grindelia hirsutula</i> var. <i>maritima</i>	CNPS 1B.2; YBC	HP	Moderate: Suitable habitat present. Would have been detectable during focused surveys – presumed absent.
Diablo helianthella	<i>Helianthella castanea</i>	CNPS 1B.2	HP	Very Low: Marginally suitable habitat present. Would have been detectable during focused surveys – presumed absent.
Short-leaved evax	<i>Hesperivax sparsiflora</i> var. <i>brevifolia</i>	CNPS 1B.2	HP	Low: Marginally suitable habitat present. Would have been detectable during focused surveys – presumed absent.
Kellogg's horkelia	<i>Horkelia cuneata</i> ssp. <i>sericea</i>	CNPS 1B.1; YBC	HP	Very Low: Suitable habitat present. Would have been detectable during focused surveys – presumed absent.
Beach layia	<i>Layia carnosa</i>	FE; SE; CNPS 1B.1	HP	Very Low: Marginally suitable habitat present. Would have been detectable during focused surveys – presumed absent.
Large-flowered linanthus	<i>Leptosiphon grandiflorus</i>	CNPS 4.2	HP	Low: Marginally suitable habitat present. Would have been detectable during focused surveys – presumed absent.
Rose linanthus	<i>Leptosiphon rosaceus</i>	CNPS 1B.1	HP	Low: Marginally suitable habitat present. Would have been detectable during focused surveys – presumed absent.
San Francisco lessingia	<i>Lessingia germanorum</i>	FE; SE; CNPS 1B.1; YBC	HP	Very Low: Marginally suitable habitat present. Would have been detectable during focused surveys – presumed absent.

Common Name	Scientific Name	Status	Habitat Present/Absent	Potential for Occurrence and Rationale
Woolly-headed lessingia	<i>Lessingia hololeuca</i>	CNPS 3	HP	Very Low: Marginally suitable habitat present. Would have been detectable during focused surveys – presumed absent.
Coast lily	<i>Lilium maritimum</i>	CNPS 1B.1	HP	Low: Marginally suitable habitat present. Would have been detectable.
Slender trefoil	<i>Lotus formosissimus</i>	CNPS 4.2	HP	Low: Marginally suitable habitat present. Would have been detectable during focused surveys – presumed absent.
Mount Diablo cottonweed	<i>Micropus amphibolus</i>	CNPS 3.2	HP	Low: Marginally suitable habitat present. Would have been detectable during focused surveys – presumed absent.
Marsh microseris	<i>Microseris paludosa</i>	CNPS 1B.2	HP	Very Low: Marginally suitable habitat present. Would have been detectable during focused surveys – presumed absent.
Curly-leaved monardella	<i>Monardella undulata</i>	CNPS 4.2	HP	Low: Marginally suitable habitat present. Would have been detectable during focused surveys – presumed absent.
Stinging phacelia	<i>Phacelia malvifolia</i>	EBCNPS A2	HP	Detected: Suitable habitat present.
Chor's popcorn-flower	<i>Plagiobothrys chorisianus</i> var. <i>chorisianus</i>	CNPS 1B.2	HP	Very Low: Marginally suitable habitat present. Would have been detectable during focused surveys – presumed absent.
Michael's rein orchid	<i>Piperia michaelii</i>	CNPS 4.2	HP	Low: Marginally suitable habitat present. Would have been detectable during focused surveys – presumed absent.
San Francisco campion	<i>Silene verecunda</i> ssp. <i>verecunda</i>	CNPS 1B.2; YBC	HP	Low: Marginally suitable habitat present. Would have been detectable during focused surveys – presumed absent.
Large flowered sand-spurry	<i>Spergularia macrotheca</i> var. <i>macrotheca</i>	EBCNPS A2	HP	Detected: Suitable habitat present
Santa Cruz microseris	<i>Stebbinsoseris decipiens</i>	CNPS 1B.2	HP	Low: Marginally suitable habitat present. Would have been detectable during focused surveys – presumed absent.
Beach starwort	<i>Stellaria littoralis</i>	CNPS 4; YBC	HP	Low: Marginally suitable habitat present. Would have been detectable during focused surveys – presumed absent.

Common Name	Scientific Name	Status	Habitat Present/Absent	Potential for Occurrence and Rationale
California seablite	<i>Suaeda californica</i>	FE; CNPS 1B.1; YBC	HP	Low: Marginally suitable habitat present. Would have been detectable during focused surveys – presumed absent.
Dune tansy	<i>Tanacetum camphoratum</i>	YBC	HP	Low: Marginally suitable habitat present. Would have been detectable during focused surveys – presumed absent.
Triquetrella	<i>Triquetrella californica</i>	CNPS 1B.2	HP	Low: Marginally suitable habitat present. Would have been detectable during focused surveys – presumed absent.
<b>Wildlife</b>				
<b>Invertebrates</b>				
Sandy beach tiger beetle	<i>Cicindela hirticollis gravida</i>	CNDDB	HP	Very Low: Marginally suitable habitat present in BSA. Nearest Occurrence: within 5 miles to the southwest.
Monarch butterfly (overwintering)	<i>Danaus plexippus</i>	CNDDB	HP	Moderate: Suitable habitat present in BSA. Observed on-site
San Francisco lacewing	<i>Nothochrysa californica</i>	CNDDB	HP	Very Low: Marginally suitable habitat present in BSA. Nearest Occurrence: within 10 miles to the south.
A leaf-cutter bee ( <i>Gummifera</i> leaf-cutter bee)	<i>Trachusa gummifera</i>	CNDDB	HP	Very Low: Marginally suitable habitat present in BSA. Nearest Occurrence: within 5 miles to the southwest.
<b>Birds</b>				
Cooper's hawk (nesting site only)	<i>Accipiter cooperii</i>	WL	HP	Moderate: Suitable habitat present in BSA. Nearest Occurrence: within 10 miles to the northeast.
Allen's hummingbird	<i>Selasphorus sasin</i>	CNDDB	HP	Moderate: Suitable habitat present in BSA.



Common Name	Scientific Name	Status	Habitat Present/Ab sent	Potential for Occurrence and Rationale
Alameda song sparrow	<i>Melospiza melodia pusillula</i>	SSC	HP foraging only	Moderate: Suitable habitat present in BSA Reported on-site.
Bank swallow	<i>Riparia riparia</i>	ST	HP	Low: Suitable habitat present in BSA.
California least tern	<i>Sternula antillarum browni</i>	FE; SE/FP	A	Not Expected: No suitable nesting or foraging habitat in the project area, although potential to forage in waters of Bay adjacent to the site.
Golden eagle (nesting/wintering sites only)	<i>Aquila chrysaetos</i>	FP; WL	HP	Very Low: Marginally suitable habitat present in BSA.
Great egret (nesting colony)	<i>Ardea alba</i>	CNDDB	HP	Nearest Occurrence: within 5 miles to the east. Moderate: Suitable habitat present in BSA.
Great blue heron (nesting colony)	<i>Ardea herodias</i>	CNDDB	HP	Moderate: Suitable habitat present in BSA.
Snowy egret (nesting colony)	<i>Egretta thula</i>	CNDDB	HP	Moderate: Suitable habitat present in BSA.
White-tailed kite (nesting sites)	<i>Elanus leucurus</i>	FP	HP	Moderate: Suitable habitat present in BSA. Nearest Occurrence: within 5 miles to the north.
American peregrine falcon (nesting)	<i>Falco peregrinus anatum</i>	FP	HP	High: Suitable habitat present in BSA. Documented nesting on both spans of SFOBB.
California gull (nesting colony)	<i>Larus californicus</i>	WL	HP	Moderate: Suitable habitat present in BSA.
Western gull	<i>Larus occidentalis</i>	MBTA	HP	Moderate: Suitable habitat present in BSA. Nesting documented on western Span of SFOBB.
Black-crowned night heron (rookery)	<i>Nycticorax nycticorax</i>	CNDDB	HP	Moderate: Suitable habitat present in BSA. Nearest Occurrence: Rookery on YBI 0.25 mile south of the BSA.
California brown pelican (overwintering)	<i>Pelecanus occidentalis californicus</i>	FP	HP	High: Suitable habitat present in BSA.
Double-crested cormorant	<i>Phalacrocorax auritus</i>	WL	HP	High: Suitable habitat present in BSA.
<b>Mammals</b>				

Common Name	Scientific Name	Status	Habitat Present/Absent	Potential for Occurrence and Rationale
Western red bat	<i>Lasiurus blossevillii</i>	SSC	HP	Moderate: Marginally suitable habitat present in BSA.
Hoary bat	<i>Lasiurus cinereus</i>	CNDDDB	HP	Moderate: Suitable habitat present in BSA.
Long-eared myotis bat	<i>Myotis evotis</i>	CNDDDB	HP	Moderate: Suitable habitat present in BSA.
Fringed myotis bat	<i>Myotis thysanodes</i>	CNDDDB	HP	Moderate: Suitable habitat present in BSA.
Long-legged myotis bat	<i>Myotis volans</i>	CNDDDB	HP	Moderate: Suitable habitat present in BSA.
San Francisco dusky-footed woodrat	<i>Neotoma fuscipes annectens</i>	SSC	HP	Moderate: Suitable habitat present in BSA.

Absent [A] - no habitat present and no further work needed. Habitat Present [HP] -habitat is, or may be present. The species may be present. Present [P] - the species is present. [CH] - project footprint is located within a designated CH unit, but does not necessarily mean that appropriate habitat is present. Status: Federal Endangered (FE); Federal Threatened (FT); Federal Proposed (FP, FPE, FPT); Federal Candidate (FC), Federal Species of Concern (FSC); State Endangered (SE); State Threatened (ST); Fully Protected (FP); State Rare (SR); State Species of Special Concern (SSC); CDFG Watch List (WL); CNPS, East Bay Chapter CNPS (EBCNPS); Yerba Buena Chapter CNPS (YBC); Tracked by CNDDDB (CNDDDB).

## **Chapter 4. Results: Biological Resources, Discussion of Impacts and Mitigation**

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### **4.1. Natural Communities of Special Concern**

Natural communities of special concern are those that are considered rare in the region or receive regulatory protection (i.e., §404 of the CWA and/or the §§1600 et seq. of the Fish and Game Code). The CNDDDB has designated a number of communities as rare; these communities are given the highest inventory priority (Holland 1986, CDFG 2003).

As discussed in the previous section, vegetation communities occurring on-site (Figure 4) that are typical of the region include:

- Eucalyptus woodland
- Mixed broadleaf conifer forest
- Nonnative scrub/shrubland
- Ruderal/landscaped
- Ruderal/disturbed

Remnant sensitive natural communities are present in small patches on-site including:

- Northern foredune
- Central Coast riparian scrub

#### **4.1.1. Discussion of Aquatic Features**

The entire BSA (Figure 2), covering the footprint of potential construction access, staging areas, and project alternatives, was surveyed on foot for any evidence of wetland indicators including wetland vegetation, or wetland hydrology, which includes standing water, depressions, evidence of saturation, or ordinary high water marks, and other hydrologic indicators (Environmental Laboratory 1987).



#### **4.1.1.1. SURVEY RESULTS FOR AQUATIC FEATURES**

No evidence of wetlands was found in the BSA. Potential federal or state jurisdictional waters on-site consist solely of unvegetated waters flowing in concrete or roadside swales (Figure 4). Nearly all of these unvegetated waters demonstrate a direct connection to the bay through culvert outlets on the shoreline. Due to the steep gradient, only the outer few feet of these waters, where they empty into the Bay, are below mean high tide (approximately 5 feet in elevation) and are tidally influenced. The mean high tide water level corresponds to federally jurisdictional tidal waters of the Bay (Figure 4). The southeast edge of the BSA boundary runs at or slightly above the mean high tide line. On the northern edge of the BSA the boundary is well above the mean high tide line. There is a total of 0.04 acre (1,852 square feet) of unvegetated waters within the BSA which may be regulated by the USACE and RWQCB under the CWA and/or CDFG under Fish and Game Code. Based on a preliminary review of photos and the jurisdictional determination map the USACE indicated via e-mail correspondence on January 4<sup>th</sup>, 2011, that several of the unvegetated waters features appear to have been constructed in uplands, drain only uplands, and are therefore not jurisdictional. USACE stated that the remaining features (Location ID's 1, 2, 4, 5, and 6), based on their position in the landscape (topography), would indicate that they may be natural ephemeral drainages, although some of them have been armored with concrete or filled with debris over the years.

BCDC permit jurisdiction includes waters of the Bay and extends 100 feet onto the shore from the mean high tide line encompassing any aquatic habitats as well as uplands. The downstream portions of unvegetated waters within 100 feet of the mean high tide line, which includes the segments under tidal influence, are under the jurisdiction of BCDC, along with the entire shoreline (Figure 2a). Of the total 1,852 square feet of unvegetated waters within the BSA, 386 square feet may also be regulated by the BCDC. Approximately 4.39 total acres (primarily uplands) falling under BCDC jurisdiction are located within the BSA.

#### **4.1.1.2. AVOIDANCE AND MINIMIZATION EFFORTS FOR AQUATIC FEATURES**

For both alternatives, the tidal waters of the Bay will be avoided by temporary construction features and permanent project features, as standard construction BMP's will be implemented to treat and minimize discharge into the Bay (Figures 6a and 6b). Existing SFOBB project staging areas that are present within the BSA addressed herein will be largely utilized for construction staging and access. Standard construction BMPs including placement of straw wattles or silt fencing along the boundary of the project area will be implemented according to an erosion control plan that will be prepared to avoid discharge into the waters of the Bay during staging and construction of the ramps. Catch basin inlet protection and installation of

straw wattles (fiber rolls) will be implemented throughout the site during construction. Other construction BMPs that will be reviewed and coordinated with the RWQCB and BCDC, as necessary, for implementation during work near the Bay waters include:

1. All concrete dust generated as part of the work within 100 feet the Bay will be vacuumed away immediately.
2. No litter, debris, or sidecasts shall be dumped into aquatic habitats. Trash and debris shall be removed from the site daily.
3. Vehicles and equipment shall only be driven within established roads and crossings. Routes and boundaries shall be clearly marked and will be located outside of aquatic areas.
4. Equipment staging and parking of vehicles will occur on established access roads and laydown yards avoiding aquatic habitats.
5. The boundary of aquatic habitats that are to be avoided will be clearly marked with brightly colored fencing, staking, or flagging for work crew avoidance.
6. Worker education and awareness training will be conducted for work crews regarding aquatic habitats and sensitive species that they support. The integrity and effectiveness of construction fencing and erosion control measures will be inspected on a daily basis. Corrective actions and repairs will be carried out immediately for fence breaches and ineffective BMP's. Fueling, washing, and maintenance of vehicles will occur 100 feet away from aquatic habitats. Equipment will be regularly maintained to avoid fluid leaks. Any leaks shall be captured in containers until equipment is moved to a repair location. Hazardous materials shall be stored more than 100 feet away from aquatic habitats. Containment and clean up plans will be prepared and put in place for immediate clean up of fluid or hazardous materials spills.
7. SWPP inspections will occur at appropriate intervals.
8. Additional impervious surface treatment measures will be implemented and may include bioswales, filters, and/or detention ponds.

#### **4.1.1.3. PROJECT IMPACTS FOR AQUATIC FEATURES**

Approximately 0.01 acre (586 square feet) of non-jurisdictional unvegetated waters will be temporarily disturbed during project construction where they coincide with potential staging and access areas for both project alternatives (Figures 6a and 6b). These drainages are concrete lined and convey stormwater runoff; therefore they have minimal value as aquatic habitat. There will be no permanent impacts to unvegetated waters under either project



alternative. These features will be restored to their current condition after construction staging is complete. The constructed project will be elevated above these features; therefore post construction impacts are not expected. The outer 100 feet of these drainages is under the jurisdiction of BCDC; however no temporary or permanent construction impacts are anticipated to these drainages within BCDC jurisdiction. Jurisdictional features will be avoided by permanent and temporary construction activities under both alternatives (Table 3). Only the non-jurisdictional features will be disturbed by temporary construction activities as described above.

The remaining lands within 100 feet of the mean high tide that will be permanently or temporarily affected are considered uplands. Under Alternative 2b there will be no permanent or temporary impacts to lands falling under the permit authority of BCDC (Table 4). Alternative 4 will involve permanent impacts to 0.25 acres and temporary disturbance to lands totaling 0.36 acres which fall under the permitting authority of BCDC (Table 4). Temporarily disturbed habitats will be restored, to the extent feasible, to their natural condition after completion of the project.

**Table 3. Jurisdictional Waters**

Potential Jurisdictional Agency	Jurisdictional Feature	Total Within Study Area	Not Impacted	Temporary Impacts	Permanent Impacts
RWQCB and/ CDFG (Waters of the State)	Unvegetated Waters	0.04 acres	2b - 0.04 acres 4 - 0.04 acres	2b - 0 acres 4 - 0 acres	0
USACE (Waters of the US)	Unvegetated Waters	0.04 acres	2b - 0.04 acres 4 - 0.04 acres	2b - 0 acres 4 - 0 acres	0

**Table 4. BCDC Jurisdiction**

Jurisdictional Agency	Jurisdictional Area	Total Within Study Area	Not Impacted	Temporary Impacts <sup>1</sup>	Permanent Impacts <sup>1</sup>
BCDC	Within 100 feet of Mean High Tide	4.39 acres	2b - 4.38 acres 4 - 4.03 acres	2b - 0 acres 4 - 0.36 acres	2b - 0 acres 4 - 0.25 acres

<sup>1</sup>Lands affected by project alternatives falling within BCDC jurisdiction are considered uplands.

#### 4.1.1.4. COMPENSATORY MITIGATION FOR AQUATIC FEATURES

The project will not result in a permanent loss of aquatic features. Compensatory mitigation for aquatic features is not proposed.



#### **4.1.1.5. CUMULATIVE IMPACTS TO AQUATIC FEATURES**

With implementation of construction BMP's, there will be no cumulative impacts to aquatic features associated with this project.

#### **4.1.2. Discussion of Northern Foredune**

Northern foredune vegetation is generally behind active beaches and in front of the more stabilized back dune coastal scrubs. This plant community is similar to active coastal dunes but is somewhat more sheltered from wind and may have a greater supply of groundwater. This zone is often described as coastal strand. This pioneer habitat typically has low species diversity, being dominated by prostrate herbs and grasses with creeping stems or rhizomes. These salt tolerant plants are also tolerant of repeated burial by shifting sands and contribute to dune stabilization. Northern foredune vegetation occurs in areas of sand accumulation along the immediate coast from Monterey County to Oregon (Holland 1986). This community is considered to be of high inventory priority by the CNDDB.

##### **4.1.2.1. SURVEY RESULTS FOR NORTHERN FOREDUNE**

Within the BSA, approximately 0.440 acre of northern foredune vegetation occurs on the southeast edge between the shoreline and active construction staging areas for the SFOBB project (Figure 4). On-site, this plant community would intergrade with northern coastal bluff scrub though these communities are currently separated by a wide dirt access road. Characteristic species present include or may include beach bursage (*Ambrosia chamissonis*), sand verbena (*Abronia maritima*), sea rocket, and saltgrass, among others. Within the BSA, northern foredune most closely corresponds to the sand verbena - beach bursage series as classified by Sawyer and Keeler-Wolf (1995) and is upland following Cowardin et al. (1979).

##### **4.1.2.2. AVOIDANCE AND MINIMIZATION EFFORTS FOR NORTHERN FOREDUNE**

Permanent project features will entirely avoid the northern foredune vegetation community on-site (Figure 6a and 6b). Temporary staging and construction access will occur directly adjacent to its location. Potential impacts during construction activities will be avoided by placement of ESA exclusion fencing 10 feet from the perimeter of the foredune community. Contractor education will be conducted, bright colored ESA fencing and signage will be implemented, and a construction monitor will confirm the fence integrity on a daily basis to protect the area from accidental equipment damage. Fence repair and/or reinforcements will be completed immediately.

#### **4.1.2.3. PROJECT IMPACTS FOR NORTHERN FOREDUNE**

There will be no project impacts to the northern foredune natural community (Figure 6 a, 6b).

#### **4.1.2.4. COMPENSATORY MITIGATION FOR NORTHERN FOREDUNE**

The project will not result in a loss of this natural community. Compensatory mitigation for northern foredune is not proposed.

#### **4.1.2.5. CUMULATIVE IMPACTS TO NORTHERN FOREDUNE**

The project will avoid the northern foredune, thus there are no cumulative impacts to this community.

### **4.1.3. Discussion of Central Coast Riparian Scrub**

Central coast riparian scrub typically consists of a scrubby streamside, open to impenetrable thickets composed of any of several species of willows (*Salix* spp). This plant community occurs close to river channels and near the coast on fine-grained sand and gravel bars with a high water table. It is distributed along and at the mouths of most perennial and many intermittent streams of the southern coast ranges, from the Bay Area to near Point Conception (Holland 1986). Central coast riparian scrub is generally regarded as early seral, meaning that it typically precedes the development of other riparian woodland or forest communities in the absence of severe flooding. However, outside of riparian situations, that is, near groundwater seeps, willow-dominated scrub represents a relatively stable plant community and is not considered seral. This community is considered to be of high inventory priority by the CNDDDB and typically falls under state jurisdiction (CDFG and RWQCB) as riparian vegetation. When rooted below the high water mark it falls within federal jurisdiction.

#### **4.1.3.1. SURVEY RESULTS FOR CENTRAL COAST RIPARIAN SCRUB**

Within the BSA, a small remnant patch of central coast riparian scrub (0.028 acre), which may be considered state jurisdictional, occurs on the south east boundary adjacent to northern foredune where a culvert outlets onto the beach (Figure 4). Characteristic plant species of central coast riparian scrub occurring within the study include arroyo willow. On-site, central coast riparian scrub conforms to the arroyo willow series as described in Sawyer and Keeler-Wolf (1995) and palustrine shrub-scrub wetland following Cowardin *et al.* (1979).

#### **4.1.3.2. AVOIDANCE AND MINIMIZATION EFFORTS FOR CENTRAL COAST RIPARIAN SCRUB**

Permanent project features will entirely avoid central coast riparian scrub vegetation on-site (Figure 6a and 6b). Temporary staging and construction access will occur directly adjacent to its location. Potential impacts during construction activities will be avoided by placement of ESA exclusion fencing 10 feet from the perimeter of the riparian vegetation. Contractor education will be conducted, bright colored ESA fencing and signage will be implemented, and a construction monitor will confirm the fence integrity on a daily basis to protect the area from accidental equipment damage. Fence repair and/or reinforcements will be completed immediately.

#### **4.1.3.3. PROJECT IMPACTS FOR CENTRAL COAST RIPARIAN SCRUB**

There will be no project impacts to central coast riparian scrub (Figure 6a, 6b).

#### **4.1.3.4. COMPENSATORY MITIGATION FOR CENTRAL COAST RIPARIAN SCRUB**

The project will not result in a loss of this natural community. Compensatory mitigation for Central Coast riparian scrub is not proposed.

#### **4.1.3.5. CUMULATIVE IMPACTS TO CENTRAL COAST RIPARIAN SCRUB**

The project will avoid Central Coast riparian scrub, thus there are no cumulative impacts to this community.

### **4.2. Special Status Plant Species**

Special-status plant species include those listed as endangered, threatened, rare, or as candidates for listing by the USFWS (USFWS 1996a, b, 2008), the CDFG (CDFG 2008a, b), and the CNPS (CNPS 2008). Federally listed plant species are not protected against “take” under the FESA. However, the FESA prohibit the removal and collection of endangered plants from lands under Federal jurisdiction. In addition, FESA prohibits the removal, cutting, digging, damage, or destruction of endangered plants on any other lands in knowing violation of state laws or regulations.

Under provision of Section 15380(d) of CEQA non-listed plant species which satisfy the minimum biological criteria for listing must be treated equivalent to listed species in making a determination of significance. CNPS List 1A, 1B and List 2 species are considered eligible for state listing as endangered or threatened under the CDFG Code and therefore qualify for consideration under this CEQA provision. CNPS List 3 and List 4 species are considered to be either plants about which more information is needed or are uncommon enough that their



status should be monitored regularly. Such plants may be eligible or may become eligible for state listing, but generally do not, qualify for protection under this CEQA provision.

Based on a review of special-status plant species in Alameda and San Francisco counties (CDFG 2006a, CNPS 2001 and 2008) and a broad knowledge of the regional flora, a total of 105 special-status plant species were determined to have at least some potential to occur within the region of the BSA. Of these, 67 special-status plant species could be eliminated due to lack of suitable habitat such as chenopod scrub, vernal pools, montane coniferous forest, pinyon and juniper woodland, intertidal flats, or lake margins to support individuals and/or populations. The remaining 38 plant species were considered to be “target species” for the purpose of site-specific focused surveys (Table 2). These 38 species were considered target species due to their having a potential for occurrence on-site ranging from very low to moderate. A summary of the status, habitat affinities, blooming period, and potential for occurrence on-site for each of the 105 regionally occurring special-status plant species is presented in Appendix B. An explanation of sensitivity status codes is provided in Appendix C.

Two special-status plant species, large flowered sand-spurrey (*Spergularia macrotheca* var. *macrotheca*) and stinging phacelia (*Phacelia malvifolia*), both CNPS East Bay Chapter List A2, were detected within the BSA during botanical surveys (Figure 7a and 7b; AECOM 2010). List A2 ranking indicates that these species occur in only three to five botanical regions in Alameda and Contra Costa counties (Lake 2004). As these species are not listed under the ESA or regarded as sensitive statewide by CDFG or CNPS they do not qualify for protection under provisions of Section 15380(d) of CEQA. However, these taxa are considered “unusual and significant” in the two counties. Species listed as “unusual or significant” include those deemed by CNPS’s East Bay Chapter to be rare, threatened or endangered in the two counties but not in the rest of California. Plants listed include those occurring in limited or threatened habitats, those occurring in isolated populations or having a narrow geographic range in the East Bay, plants found only in small, stressed, or declining populations, plants reaching their range limits in the East Bay, or plants that are in some way threatened or endangered in the East Bay, among other considerations.

A discussion of large flowered sand-spurrey and stinging phacelia is provided below. The location of the distribution of these two species in the BSA in relation to proposed project impacts is included in Figure 7a and 7b. None of the remaining target species were considered to have any potential to occur within the BSA due to a lack of suitable habitat or they were presumed absent based on negative findings of the comprehensive focused plant surveys.

The additional 12 species discussed below are those target species that were considered to have a moderate potential to occur, or those that are listed under the FESA or have been documented within five miles of the BSA (Figure 5a). Focused botanical surveys resulted in negative findings for these species, therefore they are presumed absent from the site.

The following 13 special-status plant species have been documented between five and ten miles from the BSA (Figure 5a), and were considered to have a low or very low potential to occur within marginally suitable habitats present on-site:

- San Francisco Bay spineflower (*Chorizanthe cuspidata* var. *cuspidata*), CNPS List 1B.2 and considered rare by the Yerba Buena Chapter of the CNPS
- Franciscan thistle (*Cirsium andrewsii*), CNPS List 1B.2 and considered rare by the Yerba Buena Chapter of the CNPS
- Compact cobwebby thistle (*Cirsium occidentale* var. *compactum*), CNPS List 1B.2
- San Francisco collinsia (*Collinsia multicolor*), CNPS List 1B.2 and considered rare by the Yerba Buena Chapter of the CNPS
- Western leatherwood (*Dirca occidentalis*), CNPS List 1B.2
- Dark-eyed gilia (*Gilia millefoliata*), CNPS List 1B.2
- Diablo helianthella (*Helianthella castanea*), CNPS List 1B.2
- Short-leaved evax (*Hesperevax sparsiflora* var. *brevifolia*), CNPS List 1B.2
- Kellogg's horkelia (*Horkelia cuneata* ssp. *sericea*), CNPS List 1B.1 and considered rare by the Yerba Buena Chapter of the CNPS
- Rose linanthus (*Leptosiphon rosaceus*), CNPS List 1B.1
- Marsh microseris (*Microseris paludosa*), CNPS List 1B.2
- Michael's rein orchid (*Piperia michaelii*), CNPS List 4.2
- Triquetrella (*Triquetrella californica*), CNPS List 1B.2

Based on negative findings during focused botanical surveys in spring/summer 2009 they are presumed absent from the site, therefore these 13 species are not addressed further in this report.



Figure 7a: Alternative 2b  
Impacts to Special-status Plants

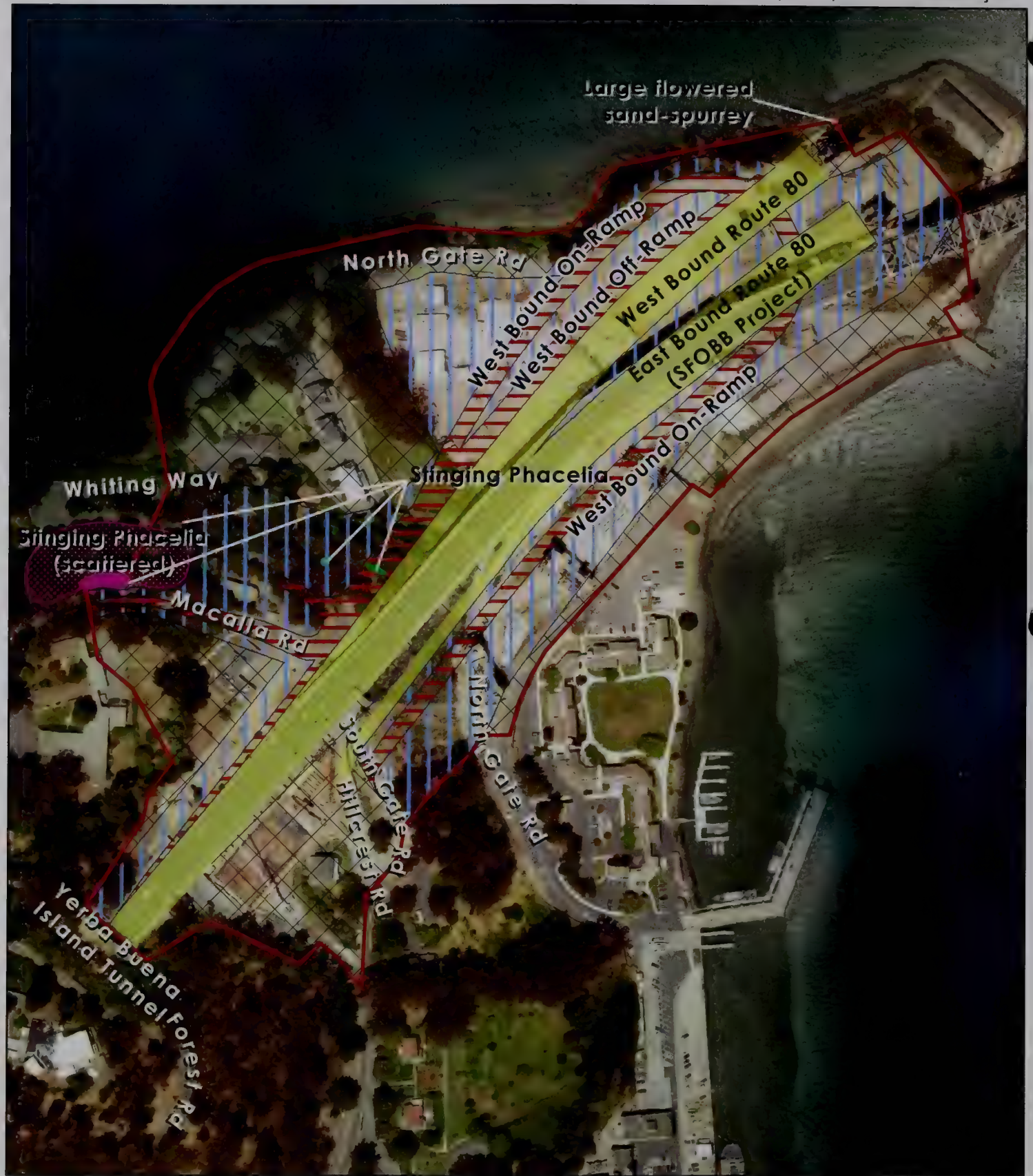











	Permanently Impacted		Not Impacted		
	Stinging Phacelia	113 sq ft		Large flowered sand-spurrey	79 sq ft
	Temporarily Impacted			Stinging Phacelia	2,445 sq ft
	Stinging Phacelia	215 sq ft		Stinging Phacelia (scattered)	34,869 sq ft
				Study Area	

Scale: 0 150 300 feet  
Data: DMJM Harris, AECOM



Figure 7b: Alternative 4  
Impacts to Special-status Plants



 Permanently Impacted	 Not Impacted		
 Stinging Phacelia	215 sq ft	 Large flowered sand-spurrey	79 sq ft
 Stinging Phacelia	2,445 sq ft	 Stinging Phacelia (scattered)	34,869 sq ft
 Temporarily Impacted		 Study Area	
 Stinging Phacelia	113 sq ft		

0 150 300 Feet  
Image: Google 2008  
Data: DMJM Harris, AECOM

#### **4.2.1. Discussion of Potentially Occurring Special-Status Plant Species Documented Within Five Miles of the Site**

##### **Stinging Phacelia**

###### **4.2.1.1. LIFE HISTORY AND HABITAT REQUIREMENTS FOR STINGING PHACELIA**

Stinging phacelia (*Phacelia malvifolia*) is an annual herb in the waterleaf family (Hydrophyllaceae) with hairy/bristly foliage and flowers that may cause dermatitis when touched. The leaves are wide and lobed and the flowers are pale cream. Stinging phacelia grows to three feet tall. It occurs on sandy or gravelly soils along the coast from Santa Barbara north to Oregon in redwood forest, mixed evergreen forest, closed-cone pine forest, and northern coastal scrub. It has been documented on YBI during previous botanical surveys (Wood Biological Consulting 2007).

Stinging phacelia is not listed or on the CNPS List. However, it is listed as a Rare, Unusual, or Significant plant of local concern (A2) by the East Bay Chapter of the CNPS indicating that it is currently found in three to five regions of the two-county area (Lake 2004).

###### **4.2.1.2. SURVEY RESULTS FOR STINGING PHACELIA**

Suitable habitat on-site includes nonnative scrub/shrublands on sandy soil. Stinging phacelia was found within the BSA during focused botanical surveys. It exists as uncommon herbaceous understory within the mixed broadleaf conifer and eucalyptus woodland forest north and northwest of the hairpin turn where Macalla Road becomes North Gate Drive (Figures 7a and 7b). Two proximal zones (within 200 feet of each other) located along the slope contour, for a total area of 0.86 acre (37,315 square feet), define the spatial extent of stinging phacelia.

###### **4.2.1.3. PROJECT IMPACTS ON STINGING PHACELIA**

Both project alternatives propose permanent and temporary impacts to areas where stinging phacelia was documented during focused surveys (Figures 7a and 7b). The total area of potential impact to stinging phacelia is provided below for each alternative:

- Alternative 2b
  - 113 square feet (0.003 acre) permanent, 215 square feet (0.005 acre) temporary



- Alternative 4
  - 215 square feet (0.005 acre) permanent, 113 square feet (0.003 acre) temporary

#### **4.2.1.4. AVOIDANCE AND MINIMIZATION EFFORTS FOR STINGING PHACELIA**

Stinging phacelia shall be avoided to the extent feasible by the chosen project alternative and protected during construction. Potential impacts during construction activities shall be avoided by placement of exclusion fencing 10 feet from the perimeter of the stinging phacelia stands outside the temporary and permanent impact area. Contractor education shall be conducted, bright-colored ESA fencing and signage shall be implemented, and a construction monitor shall confirm the fence integrity on a daily basis to protect the area from accidental equipment damage. Fence repair and/or reinforcements shall be completed immediately.

#### **4.2.1.5. COMPENSATORY MITIGATION FOR STINGING PHACELIA**

The SFCTA will offset unavoidable impacts to stinging phacelia by implementing woodland habitat revegetation plan as described in Section 1.2, as part of its Project Description. Stinging phacelia plants removed in permanent and temporary disturbance areas will be replanted at a 1:1 ratio. Compensatory mitigation is not proposed.

#### **4.2.1.6. CUMULATIVE IMPACTS FOR STINGING PHACELIA**

With implementation of avoidance and minimization measures as well as revegetation of woodland habitat, including stinging phacelia plants, which has been incorporated into the project description, cumulative impacts to stinging phacelia are not anticipated.

### **Large Flowered Sand-Spurrey**

#### **4.2.2.1. LIFE HISTORY AND HABITAT REQUIREMENTS FOR LARGE FLOWERED SAND-SPURREY**

Large flowered sand-spurrey (*Spergularia macrotheca* var. *macrotheca*) is a stout, taprooted perennial herb in the pink family (Caryophyllaceae). The species is low-growing, from 2 to 14 inches tall, with fleshy leaves with sometimes conspicuous dull-white to tan, narrowly triangular stipules. The inflorescence is glandular hairy and the flowers are pink to rosy and can appear year-round. Large flowered sand-



spurrey is found in salt flats and marshes, dunes, rocky outcrops, sandy or rocky coastal bluffs, gravelly ridges, and alkaline fields from Humboldt to San Diego county and inland in Alameda and Contra Costa Counties, from the coast inland to the Great Central Valley and the Mojave Desert.

Large flowered sand-spurrey has no official state or federal status as a protected species but is an East Bay Chapter CNPS List A-2. A-ranking indicates that it is known from only five or fewer regions of the East Bay or it is otherwise endangered here. These A-ranked species are required for consideration under CEQA guidelines when they occur in areas where development or land use changes are proposed.

#### **4.2.2.2. SURVEY RESULTS FOR LARGE FLOWERED SAND-SPURREY**

Within the BSA, large flowered sand-spurrey is found on the north side of the east point as low clumps on a sparsely populated sandstone cliff, occurring just above the high tide line and below the scrub vegetation. This population is comprised of approximately 20 individuals covering approximately 78.53 square feet (0.002 acre). The plants are located outside of the proposed temporary and permanent impact areas for both Alternative 2b and Alternative 4 (Figures 7a and 7b). They are, however, located within 100 feet of the temporary disturbance areas and there is potential for incidental impacts during construction.

#### **4.2.2.3. PROJECT IMPACTS ON LARGE FLOWERED SAND-SPURREY**

Large flowered sand-spurrey shall be avoided to the extent feasible and protected during construction (Figure 7a and 7b).

#### **4.2.2.4. AVOIDANCE AND MITIGATION EFFORTS FOR LARGE FLOWERED SAND-SPURREY**

Potential impacts during construction activities shall be avoided by placement of exclusion fencing 10 feet from the perimeter of the large flowered sand-spurrey stand outside the temporary and permanent impact area. Contractor education shall be conducted, bright-colored ESA fencing and signage shall be implemented, and a construction monitor shall confirm the fence integrity on a daily basis to protect the area from accidental equipment damage. Fence repair and/or reinforcements shall be completed immediately.

#### **4.2.2.5. COMPENSATORY MITIGATION FOR LARGE FLOWERED SAND-SPURREY**

Loss of individuals is not anticipated. Compensatory mitigation is not proposed.

#### **4.2.2.6. CUMULATIVE IMPACTS FOR LARGE FLOWERED SAND-SPURREY**

With implementation of avoidance and minimization measures, cumulative impacts to large flowered sand-spurrey are not anticipated.

### **Beach Layia**

#### **4.2.3.1. LIFE HISTORY AND HABITAT REQUIREMENTS FOR BEACH LAYIA**

Beach layia (*Layia carnosa*) is a small, glandular annual herb with spreading stems and fleshy, oblong leaves in the sunflower family (*Asteraceae*). Depending on conditions, there can be a single stem or multiple stems up to six inches tall and more than 16 inches in breadth. The inflorescences include white-liguled ray flowers (composing the outer “petals”) and yellow-petaled disk flowers with purple anthers; there are persistent, plumose pappus bristles. The blooming period is March to July. Required habitat consists of sparsely vegetated, semi-stabilized coastal dunes with recent wind erosion, usually in the nearshore dunes.

Historical distribution included Humboldt, Monterey, Marin, Santa Barbara, and San Francisco Counties. The species was extirpated from San Francisco with the development of the dunes and has not been documented in the Bay region since 1904. Twenty (20) extant populations are found in Humboldt County, Point Reyes National Seashore in Marin County, Monterey County, and Santa Barbara County. Beach Layia is federally listed as Endangered and is on CNPS List 1B.1. No CH has been designated.

#### **4.2.3.2. SURVEY RESULTS FOR BEACH LAYIA**

Beach layia is considered to have very low potential to occur within the BSA. Suitable habitat on-site includes northern foredune on the northeast portion of the BSA. Beach layia was not observed in the BSA during focused botanical surveys and would have been detectable had it been present. Thus beach layia is presumed absent within the BSA.

#### **4.2.3.3. PROJECT IMPACTS ON BEACH LAYIA**

Due to its presumed absence within the BSA and avoidance of northern foredune habitat, project impacts to beach layia are not anticipated.

#### **4.2.3.4. AVOIDANCE AND MINIMIZATION EFFORTS FOR BEACH LAYIA**

Beach layia is presumed absent from the BSA. Therefore, avoidance measures are not proposed.

#### **4.2.3.5. COMPENSATORY MITIGATION FOR BEACH LAYIA**

Under both alternatives, the project would not result in loss of any potential or occupied beach layia habitat. Compensatory mitigation is not proposed.

#### **4.2.3.6. CUMULATIVE IMPACTS ON BEACH LAYIA**

Under both alternatives, the project would not result in loss of any potential or occupied beach layia habitat. Therefore, cumulative impacts to beach layia are not anticipated.

### **California Sea-Blite**

#### **4.2.4.1. LIFE HISTORY AND HABITAT REQUIREMENTS FOR CALIFORNIA SEA-BLITE**

California sea-blite (*Suaeda californica*) is a low perennial semi-woody shrub in the goosefoot family (previously Chenopodiaceae, now Amaranthaceae) with numerous sprawling branches, fleshy linear leaves, and inconspicuous pale green flowers. The blooming period is July to October. Suitable habitat is confined to sandy upper salt marshes and sandy or shell estuarine beaches in the high tide line.

The historic distribution of California sea-blite included Central and South Bay, Petaluma River, and Central Coast marshes. Documented historical CNDDDB occurrences include Bayfarm Island (Alameda), Albany, and San Leandro, Alameda County; these populations have been extirpated. Current known locations include Morro Bay and Cayucos Point in San Luis Obispo County, several reintroduced populations on the San Francisco Peninsula (Pier 94 and Pier 98), and in Emeryville at Eastshore State Park (Bloom 2007). Additional reintroductions are planned for Berkeley, Oakland, and San Leandro, in Alameda County (Baye 2007). California sea-blite is federally listed as Endangered and is on CNPS List 1B.1 (indicating that the species is severely endangered in California), but no CH has been designated.

#### **4.2.4.2. SURVEY RESULTS FOR CALIFORNIA SEA-BLITE**

California sea-blite is considered to have low potential to occur within the BSA. Suitable habitat on-site includes northern foredune on the northeast portion of the



BSA, which includes small patches of salt-marsh species associated with the required habitat of California sea-blite. California sea-blite was not observed in the BSA during focused botanical surveys and would have been detectable had it been present. Thus California sea-blite is presumed absent within the BSA.

#### **4.2.4.3. PROJECT IMPACTS ON CALIFORNIA SEA-BLITE**

Due to its presumed absence within the BSA, and avoidance of northern foredune habitat, project impacts to California sea-blite are not anticipated.

#### **4.2.4.4. AVOIDANCE AND MITIGATION EFFORTS FOR CALIFORNIA SEA-BLITE**

California sea-blite is presumed absent from the BSA. Therefore, avoidance measures are not proposed.

#### **4.2.4.5. COMPENSATORY MITIGATION FOR CALIFORNIA SEA-BLITE**

Under both alternatives, the project would not result in loss of any potential or occupied California sea-blite habitat. Compensatory mitigation is not proposed.

#### **4.2.4.6. CUMULATIVE IMPACTS FOR CALIFORNIA SEA-BLITE**

Under both alternatives, the project would not result in loss of any potential or occupied California sea-blite habitat. Therefore, cumulative impacts to California sea-blite are not anticipated.

### **Choris's Popcorn Flower**

#### **4.2.5.1. LIFE HISTORY AND HABITAT REQUIREMENTS FOR CHORIS'S POPCORN FLOWER**

Choris's popcorn flower (*Plagiobothrys chorisianus* var. *chorisianus*) is an annual herb in the borage family (Boraginaceae). Less than 40 centimeters tall and sparsely short-strigose, the stems are decumbent to erect and branched from the upper axils. The lower leaf pairs are generally fused at the bases, loosely sheathing the stem. The inflorescence pedicel is generally larger than the calyx and the flowers are five to six millimeters wide, all white or yellow inside the tube. The blooming period is March to June. Choris's popcorn flower is associated with mesic habitats.

Choris's popcorn flower is found in chaparral, coastal scrub, and coastal prairie on the Central Coast and southwest Bay Area. Extant populations are recorded only in Santa Cruz, San Mateo, and San Francisco counties. Choris's popcorn flower

intergrades with *P. c. var. hickmanii* and the differences may be environmentally induced. If so, recognition of two varieties may not be warranted. The species is threatened by development. Choris's popcorn flower is on the CNPS List 1B.2 and is a California endemic. It is fairly endangered in California but has no formal state or federal status.

#### **4.2.5.2. SURVEY RESULTS FOR CHORIS'S POPCORN FLOWER**

Suitable habitat for Choris's popcorn flower on-site includes nonnative scrub/shrubland on the south- and northeast portion of the BSA. Choris's popcorn flower was not observed in the BSA during focused botanical surveys and would have been detectable had it been present. Thus Choris's popcorn flower is presumed absent within the BSA.

#### **4.2.5.3. PROJECT IMPACTS ON CHORIS'S POPCORN FLOWER**

Due to its presumed absence within the BSA, project impacts to Choris's popcorn flower are not anticipated.

#### **4.2.5.4. AVOIDANCE AND MITIGATION EFFORTS FOR CHORIS'S POPCORN FLOWER**

Choris's popcorn flower is presumed absent from the BSA. Therefore, avoidance measures are not proposed.

#### **4.2.5.5. COMPENSATORY MITIGATION FOR CHORIS'S POPCORN FLOWER**

Under both alternatives, the project would not result in loss of any occupied Choris's popcorn flower habitat. Compensatory mitigation is not proposed.

#### **4.2.5.6. CUMULATIVE IMPACTS FOR CHORIS'S POPCORN FLOWER**

Under both alternatives, the project would not result in loss of any occupied Choris's popcorn flower habitat. Therefore, cumulative impacts to Choris's popcorn flower are not anticipated.

## **Coastal Bluff Morning-Glory**

### **4.2.6.1. LIFE HISTORY AND HABITAT REQUIREMENTS FOR COASTAL BLUFF MORNING-GLORY**

Coastal bluff morning-glory (*Calystegia purpurata* ssp. *saxicola*) is a perennial, trailing herb in the morning-glory family (Convolvulaceae). The stems are weakly climbing, generally less than 3 feet long, and glabrous. The leaves are ovate-triangular to reniform and the flowers white or cream-colored to purple. The blooming period is May to September.

Coastal bluff morning-glory is endemic to California and is found in rocky coastal scrub and dunes along the north and central coast and the Bay area. It is also associated with north coast coniferous forest. The species is threatened by development, foot traffic, and nonnative plants. Coastal bluff morning-glory has no formal state or federal status but is on the CNPS List 1B.2 and is fairly endangered in California.

### **4.2.6.2. SURVEY RESULTS FOR COASTAL BLUFF MORNING-GLORY**

Coastal bluff morning-glory is considered to have moderate potential to occur within the BSA. Suitable habitat on-site includes nonnative scrub/shrubland and northern foredune on the south- and northeast portions of the BSA. Coastal bluff morning-glory was not observed in the BSA during focused botanical surveys and would have been detectable had it been present. Thus coastal bluff morning-glory is presumed absent within the BSA.

### **4.2.6.3. PROJECT IMPACTS ON COASTAL BLUFF MORNING-GLORY**

Due to its presumed absence within the BSA, project impacts to coastal bluff morning-glory are not anticipated.

### **4.2.6.4. AVOIDANCE AND MITIGATION EFFORTS FOR COASTAL BLUFF MORNING-GLORY**

Coastal bluff morning-glory is presumed absent from the BSA. Therefore, avoidance measures are not proposed.

### **4.2.6.5. COMPENSATORY MITIGATION FOR COASTAL BLUFF MORNING-GLORY**

Under both alternatives, the project would not result in loss of any occupied coastal bluff morning-glory habitat. Compensatory mitigation is not proposed.



#### **4.2.6.6. CUMULATIVE IMPACTS FOR COASTAL BLUFF MORNING-GLORY**

Under both alternatives, the project would not result in loss of any occupied coastal bluff morning glory habitat. Therefore, cumulative impacts to coastal bluff morning glory are not anticipated.

### **Dune Gilia**

#### **4.2.7.1. LIFE HISTORY AND HABITAT REQUIREMENTS FOR DUNE GILIA**

Dune gilia or blue coast gilia (*Gilia capitata* ssp. *chamissonis*) is a low annual herb in the phlox family (Polemoniaceae). It has basal, pinnately lobed leaves with a skunk-like odor. It produces bright blue-violet flowers up to one half inch across from April through July. Dune gilia is restricted to coastal sand hills, on dunes and coastal scrub habitat, from San Francisco to Bodega Bay. Although it was once very common on the San Francisco dunes, it is now restricted to three locations in the Presidio near Baker Beach and one location in the Sunset District. Dune gilia is also recorded on the Point Reyes Peninsula and Angel Island, Marin County. Dune gilia is endemic to California and classified as CNPS List 1B.1, indicating that it is endangered throughout its range.

#### **4.2.7.2. SURVEY RESULTS FOR DUNE GILIA**

Dune gilia is considered to have moderate potential to occur within the BSABSA. Suitable habitat on-site includes northern foredune on the northeast portion of the BSA. It has been documented on sandy soils on the eastern portion of YBIBSA. Dune gilia was not observed in the BSA during focused botanical surveys and would have been detectable had it been present. Thus dune gilia is presumed absent within the BSA.

#### **4.2.7.3. PROJECT IMPACTS ON DUNE GILIA**

Due to its presumed absence within the BSA, and avoidance of northern foredune habitat, project impacts to dune gilia are not anticipated.

#### **4.2.7.4. AVOIDANCE AND MITIGATION EFFORTS FOR DUNE GILIA**

Dune gilia is presumed absent from the BSA. Therefore, avoidance measures are not proposed.

#### **4.2.7.5. COMPENSATORY MITIGATION FOR DUNE GILIA**

Under both alternatives, the project would not result in loss of any potential or occupied dune gilia habitat. Compensatory mitigation is not proposed.

#### **4.2.7.6. CUMULATIVE IMPACTS FOR DUNE GILIA**

Under both alternatives, the project would not result in loss of any potential or occupied dune gilia habitat. Therefore, cumulative impacts to dune gilia are not anticipated.

### **Fragrant Fritillary**

#### **4.2.8.1. LIFE HISTORY AND HABITAT REQUIREMENTS FOR FRAGRANT FRITILLARY**

Fragrant fritillary (*Fritillaria liliacea*) is a perennial herb in the lily family (Liliaceae) with nodding flowers with white petals with a greenish stripe that bloom from February to April. The plant grows to 14 inches and, as the name implies, typically has a sweet scent (but may be odorless). Fragrant fritillary grows in heavy soils, including serpentine, on open hills and fields near the coast including woodlands, coastal prairie, coastal scrub, and valley and foothill grassland. Fragrant fritillary is on the CNPS List 1B.2, indicating that it is considered fairly endangered throughout its range. It is also listed as a rare plant of San Francisco by the Yerba Buena Chapter of the CNPS.

#### **4.2.8.2. SURVEY RESULTS FOR FRAGRANT FRITILLARY**

Fragrant fritillary is considered to have low potential to occur within the BSA. Suitable habitat on-site includes nonnative scrub/shrublands and on the edges of the mixed broadleaf forest. Fragrant fritillary was not observed in the BSA during focused botanical surveys and would have been detectable had it been present. Thus fragrant fritillary is presumed absent within the BSA.

#### **4.2.8.3. PROJECT IMPACTS ON FRAGRANT FRITILLARY**

Due to its presumed absence within the BSA, project impacts to fragrant fritillary are not anticipated.

#### **4.2.8.4. AVOIDANCE AND MITIGATION EFFORTS FOR FRAGRANT FRITILLARY**

Fragrant fritillary is presumed absent from the BSA. Therefore, avoidance measures are not proposed.

#### **4.2.8.5. COMPENSATORY MITIGATION FOR FRAGRANT FRITILLARY**

Under both alternatives, the project would not result in loss of any occupied fragrant fritillary habitat. Compensatory mitigation is not proposed.

#### **4.2.8.6. CUMULATIVE IMPACTS FOR FRAGRANT FRITILLARY**

Under both alternatives, the project would not result in loss of any occupied fragrant fritillary habitat. Therefore, cumulative impacts to fragrant fritillary are not anticipated.

### **Pt. Reyes Birds-Beak**

#### **4.2.9.1. LIFE HISTORY AND HABITAT REQUIREMENTS FOR PT. REYES BIRDS-BEAK**

Pt. Reyes birds-beak (*Cordylanthus maritimus* ssp. *palustris*) is an annual herb in the figwort family (Scrophulariaceae). It is a low-growing hemi-parasite found in coastal salt marshes. It produces spikes of white to cream flowers from June through October. Habitat of the subspecies has been greatly reduced as a result of development and it has been adversely affected by foot traffic, invasive nonnative plants, altered hydrology and cattle grazing. Pt. Reyes birds-beak is believed to be extant in Humboldt, Marin, and Sonoma counties and is believed possibly extirpated in Alameda, Santa Clara, and San Mateo counties. Pt. Reyes birds-beak is on the CNPS's List 1B.2, indicating that it is considered to be rare, threatened, or endangered in California.

#### **4.2.9.2. SURVEY RESULTS FOR PT. REYES BIRDS-BEAK**

The species is considered to have low potential to occur within the BSA. Suitable habitat on-site includes northern foredune in the northeast portion of the BSA, which includes salt-marsh species associated with the required habitat of Pt. Reyes birds-beak. Pt. Reyes birds-beak was not observed in the BSA during focused botanical surveys and would have been detectable had it been present. Thus Pt. Reyes birds-beak is presumed absent within the BSA.



#### **4.2.9.3. PROJECT IMPACTS ON PT. REYES BIRDS-BEAK**

Due to its presumed absence within the BSA, and avoidance of northern foredune habitat, project impacts to Pt. Reyes birds-beak are not anticipated.

#### **4.2.9.4. AVOIDANCE AND MITIGATION EFFORTS FOR PT. REYES BIRDS-BEAK**

Pt. Reyes birds-beak is presumed absent from the BSA. Therefore, avoidance measures are not proposed.

#### **4.2.9.5. COMPENSATORY MITIGATION FOR PT. REYES BIRDS-BEAK**

Under both alternatives, the project would not result in loss of any potential or occupied Pt. Reyes birds-beak habitat. Compensatory mitigation is not proposed.

#### **4.2.9.6. CUMULATIVE IMPACTS FOR PT. REYES BIRDS-BEAK**

Under both alternatives, the project would not result in loss of any potential or occupied Pt. Reyes birds-beak habitat. Therefore, cumulative impacts to Pt. Reyes birds-beak are not anticipated. With implementation of avoidance and minimization measures for northern foredune, cumulative effects to Pt. Reyes birds-beak are not anticipated.

### **Robust Spineflower**

#### **4.2.10.1. LIFE HISTORY AND HABITAT REQUIREMENTS FOR ROBUST SPINEFLOWER**

Robust spineflower (*Chorizanthe robusta* var. *robusta*) is a low annual herb with small, grayish, hairy leaves and clusters of small, hairy, jagged-lobed pale pink flowers, in the buckwheat family (Polygonaceae). The blooming period is April to September. Suitable habitat is confined to coastal dunes, sandy coastal scrub, chaparral, and cismontane woodland. Its historic distribution included coastal regions of central California and the Bay. Documented historical CNDDDB occurrences include the Cities of Alameda, South San Francisco and Ocean View district in San Francisco; the species is believed extirpated from these areas, including all of Alameda County. Populations have been recently documented in Monterey, Santa Cruz, and San Mateo Counties. Robust spineflower is federally listed as Endangered and is on CNPS List 1B.1. No critical habitat has been designated.

#### **4.2.10.2. SURVEY RESULTS FOR ROBUST SPINEFLOWER**

Robust spineflower is considered to have very low potential to occur within the BSA. Suitable habitat on-site includes northern foredune, nonnative scrub/shrublands, and on the edges of the mixed broadleaf forest. Robust spineflower was not observed in the BSA during focused botanical surveys and would have been detectable had it been present. Thus robust spineflower is presumed absent within the BSA.

#### **4.2.10.3. PROJECT IMPACTS ON ROBUST SPINEFLOWER**

Due to its presumed absence within the BSA, project impacts to robust spineflower are not anticipated.

#### **4.2.10.4. AVOIDANCE AND MITIGATION EFFORTS FOR ROBUST SPINEFLOWER**

Robust spineflower is presumed absent from the BSA. Therefore, avoidance measures are not proposed.

#### **4.2.10.5. COMPENSATORY MITIGATION FOR ROBUST SPINEFLOWER**

Under both alternatives, the project would not result in loss of any occupied robust spineflower habitat. Compensatory mitigation is not proposed.

#### **4.2.10.6. CUMULATIVE IMPACTS FOR ROBUST SPINEFLOWER**

Under both alternatives, the project would not result in loss of any occupied robust spineflower habitat. Therefore, cumulative impacts to robust spineflower are not anticipated.

### **San Francisco Champion**

#### **4.2.11.1. LIFE HISTORY AND HABITAT REQUIREMENTS FOR SAN FRANCISCO CAMPION**

San Francisco champion (*Silene verecunda* ssp. *verecunda*) is a perennial herb in the pink family (Caryophyllaceae). There are typically multiple fuzzy stems up to 1.5 feet tall. The flowers have tubular sepals and lobed pinkish petals. The blooming period is March to June. San Francisco champion occurs on coastal bluffs, coastal scrub, chaparral, and dunes, on sandy or rocky soils. The species is known from fewer than 20 occurrences in Santa Cruz, San Mateo, San Francisco, and Sutter counties. In San Francisco populations have been documented on Mt. Davidson and at Baker Beach.

San Francisco campion is on the CNPS's List 1B.2, indicating that it is considered fairly endangered throughout its range.

#### **4.2.11.2. SURVEY RESULTS FOR SAN FRANCISCO CAMPION**

San Francisco campion is considered to have low potential to occur within the BSA. Suitable habitat on-site includes nonnative scrub/shrublands and bluffs. San Francisco campion was not observed in the BSA during focused botanical surveys and would have been detectable had it been present. Thus San Francisco campion is presumed absent within the BSA.

#### **4.2.11.3. PROJECT IMPACTS ON SAN FRANCISCO CAMPION**

Due to its presumed absence within the BSA, project impacts to San Francisco campion are not anticipated.

#### **4.2.11.4. AVOIDANCE AND MITIGATION EFFORTS FOR SAN FRANCISCO CAMPION**

San Francisco campion is presumed absent from the BSA. Therefore, avoidance measures are not proposed.

#### **4.2.11.5. COMPENSATORY MITIGATION FOR SAN FRANCISCO CAMPION**

Under both alternatives, the project would not result in loss of any occupied San Francisco campion habitat. Compensatory mitigation is not proposed.

#### **4.2.11.6. CUMULATIVE IMPACTS FOR SAN FRANCISCO CAMPION**

Under both alternatives, the project would not result in loss of any occupied San Francisco campion habitat. Therefore, cumulative impacts to San Francisco campion are not anticipated.

### **San Francisco Gumplant**

#### **4.2.12.1. LIFE HISTORY AND HABITAT REQUIREMENTS FOR SAN FRANCISCO GUMPLANT**

San Francisco gumplant (*Grindelia hirsutula* var. *maritima*) is a perennial shrub in the sunflower family (Asteraceae) that grows up to 1.5 feet tall. The inflorescences have yellow outer "petals" and the stems are reddish brown. The species is found in coastal bluff scrub, coastal scrub, and valley/foothill grassland habitats, on sandy or serpentine slopes. San Francisco gumplant is found along the coast from San Luis Obispo to Marin County. The closest occurrences are from the Presidio, other open



space areas in San Francisco, and Mt. Bruno. Many populations documented in the 1980's in San Francisco are presumed extant, and more surveys are needed. Remaining populations are threatened by coastal development and nonnative invasive plants. San Francisco gumplant is on the CNPS List 1B.2, indicating that it is considered fairly endangered throughout its range. It is also listed as a rare plant of San Francisco and a rare plant of the Presidio by the Yerba Buena Chapter of the CNPS.

#### **4.2.12.2. SURVEY RESULTS FOR SAN FRANCISCO GUMPLANT**

San Francisco gumplant is considered to have moderate potential to occur within the BSA. Suitable habitat on-site includes nonnative scrub/shrublands on sandy soil and on bluffs. San Francisco gumplant was not observed in the BSA during focused botanical surveys and would have been detectable had it been present. Thus San Francisco gumplant is presumed absent within the BSA.

#### **4.2.12.3. PROJECT IMPACTS ON SAN FRANCISCO GUMPLANT**

Due to its presumed absence within the BSA, project impacts to for San Francisco gumplant are not anticipated.

#### **4.2.12.4. AVOIDANCE AND MITIGATION EFFORTS FOR SAN FRANCISCO GUMPLANT**

San Francisco gumplant is presumed absent from the BSA. Therefore, avoidance measures are not proposed.

#### **4.2.12.5. COMPENSATORY MITIGATION FOR SAN FRANCISCO GUMPLANT**

Under both alternatives, the project would not result in loss of any occupied San Francisco gumplant habitat. Compensatory mitigation is not proposed.

#### **4.2.12.6. CUMULATIVE IMPACTS FOR SAN FRANCISCO GUMPLANT**

Under both alternatives, the project would not result in loss of any occupied San Francisco gumplant; therefore, cumulative impacts to San Francisco gumplant are not anticipated.

## **San Francisco Lessingia**

### **4.2.13.1. LIFE HISTORY AND HABITAT REQUIREMENTS FOR SAN FRANCISCO LESSINGIA**

San Francisco lessingia (*Lessingia germanorum*) is an annual herb in the sunflower family (Asteraceae). It forms a low crown of thin, interwoven branches with entire to pinnately lobed and toothed leaves up to one inch long. Inflorescences are mostly solitary, up to one half inch high and consisting of deep yellow disk flowers with a reddish-brown band in the throat. Flowering generally occurs from August through November although it sometimes begins as early as July. San Francisco lessingia is restricted to coastal scrub in openings on sandy flats and remnant dunes. It is known from only five natural occurrences (four in the Presidio and one in Daly City). It has been reintroduced at a sixth location in the Presidio. Historically, San Francisco lessingia is only known from San Francisco and San Mateo counties. San Francisco lessingia is federally and state-listed endangered. It is on the CNPS's List 1B:1, indicating that it is considered severely endangered in California. It is also on the list of rare plants for the San Francisco area by the Yerba Buena Chapter of the CNPS.

### **4.2.13.2. SURVEY RESULTS FOR SAN FRANCISCO LESSINGIA**

San Francisco lessingia is considered to have very low potential to occur within the BSA. Suitable habitat on-site includes nonnative scrub/shrubland and northern foredune habitat. San Francisco lessingia was not observed in the BSA during focused botanical surveys and would have been detectable had it been present. Thus San Francisco lessingia is presumed absent within the BSA.

### **4.2.13.3. PROJECT IMPACTS ON SAN FRANCISCO LESSINGIA**

Due to its presumed absence within the BSA, project impacts to for San Francisco lessingia are not anticipated.

### **4.2.13.4. AVOIDANCE AND MITIGATION EFFORTS FOR SAN FRANCISCO LESSINGIA**

San Francisco lessingia is presumed absent from the BSA. Therefore, avoidance measures are not proposed.

### **4.2.13.5. COMPENSATORY MITIGATION FOR SAN FRANCISCO LESSINGIA**

Under both alternatives, the project would not result in loss of any occupied San Francisco lessingia habitat. Compensatory mitigation is not proposed.

#### **4.2.13.6. CUMULATIVE IMPACTS FOR SAN FRANCISCO LESSINGIA**

Under both alternatives, the project would not result in loss of any occupied San Francisco lessingia; therefore, cumulative impacts to San Francisco lessingia are not anticipated.

### **Santa Cruz Microseris**

#### **4.2.14.1. LIFE HISTORY AND HABITAT REQUIREMENTS FOR SANTA CRUZ MICROSERIS**

Santa Cruz microseris (*Stebbinsoseris decipiens*) is an annual herb in the sunflower family (Asteraceae) with yellow inflorescences and mostly basal leaves. It grows to approximately one foot tall and blooms between April and May. It occurs in open, sandy and shaly sites, in broadleaved upland forest, closed-cone coniferous forest, chaparral, coastal prairie, coastal scrub, valley and foothill grasslands, and sometimes on serpentine soils. It is documented from Monterey, Santa Cruz, and Marin counties, including on Angel Island. Santa Cruz microseris is on the CNPS List 1B.2, indicating that it is considered fairly endangered throughout its range.

#### **4.2.14.2. SURVEY RESULTS FOR SANTA CRUZ MICROSERIS**

Santa Cruz microseris is considered to have low potential to occur within the BSA. Suitable habitat on-site includes openings in mixed broadleaf forest or nonnative scrub/shrubland. Santa Cruz microseris was not observed in the BSA during focused botanical surveys and would have been detectable had it been present. Thus Santa Cruz microseris is presumed absent within the BSA.

#### **4.2.14.3. PROJECT IMPACTS ON SANTA CRUZ MICROSERIS**

Due to its presumed absence within the BSA, project impacts to for Santa Cruz microseris are not anticipated.

#### **4.2.14.4. AVOIDANCE AND MITIGATION EFFORTS FOR SANTA CRUZ MICROSERIS**

Santa Cruz microseris is presumed absent from the BSA. Therefore, avoidance measures are not proposed.

#### **4.2.14.5. COMPENSATORY MITIGATION FOR SANTA CRUZ MICROSERIS**

Under both alternatives, the project would not result in loss of any occupied Santa Cruz microseris habitat. Compensatory mitigation is not proposed.



#### **4.2.14.6. CUMULATIVE IMPACTS FOR SANTA CRUZ MICROSERIS**

Under both alternatives, the project would not result in loss of any occupied Santa Cruz microseris; therefore, cumulative impacts to Santa Cruz microseris are not anticipated.

### **4.3. Special Status Animal Species**

Special-status animal species are included in the following categories:

- Species listed, species proposed for listing, or candidates for possible future listing as threatened or endangered under the FESA
- Species listed or proposed for listing by the State of California as threatened or endangered under CESA
- Wildlife species considered species of special concern by CDFG
- Wildlife species designated as fully protected by the Fish and Game Code
- Birds which receive protection under the Eagle Act (e.g., bald eagle, golden eagle) and the MBTA. All birds, except European starlings, English house sparrows, rock doves (pigeons), and non-migratory game birds such as quail, pheasant, and grouse, are protected under the MBTA.

Based on a literature review and a familiarity with the fauna within the project region, a total of 105 special-status wildlife species were considered to have at least some potential to occur within the region, have been recorded historically in the project vicinity, or were evaluated during biological resource assessments for other projects occurring on or near YBI or the SFOBB (Appendix A). Of these 105 species, 78 are not expected to occur within the BSA due to a lack of suitable habitat, or the fact that the BSA lies outside of the species' current range.

#### **4.3.1. Discussion of Special-Status Invertebrates**

Based on a literature review, previous biological reports for projects on or near YBI or the SFOBB, and a familiarity with the fauna within the project region, a total of 26 special-status invertebrate species were initially considered for this report. Of these species, 22 are not expected to occur on-site due to a lack of suitable habitat, the fact that the project site lies outside of their range, and/or isolation from known

populations (see Appendix A). The four remaining special-status invertebrate species that have potential to occur within the BSA are discussed in further detail below.

#### **4.3.1.1 SANDY BEACH TIGER BEETLE**

##### ***4.3.1.1.1. Life History and Habitat Requirements for Sandy Beach Tiger Beetle***

The sandy beach tiger beetle, *Cicindela hirticollis gravida*, a species tracked by the CNDDDB, is a subspecies of *Cicindela hirticollis* tiger beetles. *Cicindela* tiger beetles are usually brownish colored beetles with lighter patterned areas, ranging in size from 12-15 mm in length. They are found occupying moist sand near the ocean, for example in swales behind dunes or upper beaches beyond normal high tides. They are generally a spring/fall species with a one or two-year lifecycle, that had a historical distribution ranging along the immediate coast from north of San Francisco south slightly into Mexico. The sandy beach tiger beetle is now extirpated from most of the sites where it previously occurred (NatureServe 2008, USGS 2008).

##### ***4.3.1.1.2. Survey Results for Sandy Beach Tiger Beetle***

On-site, the sandy beach tiger beetle is considered to have a very low potential to occur due to the availability of marginally suitable habitat on the strip of sandy beach on the east side of BSA, adjacent to the USCG facility. The nearest known occurrence of the sandy beach tiger beetle is within ten miles to the southwest.

##### ***4.3.1.1.3. Avoidance and Minimization Measures for Sandy Beach Tiger Beetle***

Exclusion fencing will be placed around sandy dune habitats and contractor education will be conducted to prevent encroachment of construction activities.

##### ***4.3.1.1.4. Project Impacts on Sandy Beach Tiger Beetle***

Sandy beach tiger beetle have the potential to occur within the BSA. As described in Section 4.2.2, the project will employ avoidance measures for the northern foredune community which lies outside of the proposed permanent and temporary construction footprint for both alternatives. Thus impacts to potential sandy beach tiger beetle habitat are not anticipated.

##### ***4.3.1.1.5. Compensatory Mitigation for Sandy Beach Tiger Beetle***

Impacts to potential sandy beach tiger beetle habitat are not anticipated. In addition, the potential habitat within the BSA is considered marginal and the species has a very low potential to be present based on habitat quality and lack of occurrences in the vicinity. Compensatory mitigation is not proposed.

#### **4.3.1.1.6. Cumulative Impacts for Sandy Beach Tiger Beetle**

In addition to the current project, several other construction projects are being undertaken or are in the planning stages in the immediate vicinity. These projects include the construction of the new SFOBB East Span, and the Treasure Island and YBI Redevelopment Plan. The combined construction efforts will likely have negligible effects on potential habitat for sandy beach tiger beetle on the eastern portion of YBI as well as the total available potential habitat on the island.

#### **4.3.1.2 MONARCH BUTTERFLY**

##### **4.3.1.2.1 Life History and Habitat Requirements for Monarch Butterfly**

The monarch butterfly, a species tracked by the CNDDDB, is a large, familiar orange butterfly in the family Nymphalidae, or brush-footed butterflies. Monarchs are a migratory species, with successive generations making long-distance migrations to the same overwintering sites year after year. These overwintering sites occur in very specific microclimates which are vulnerable to human disturbance, particularly through the destruction or alteration of wind-protected, coastal tree groves. Upon hatching, monarch caterpillars feed on their host plant, milkweed (*Asclepias* sp.), before pupating and becoming adults. Monarchs arrive at the coast and begin forming colonies in trees in late September (Lane 1993). They do not have persistent colony formations. Temporary colonies tend to break up early October to early December, and then disperse to other permanent sites where they will spend the winter. The date in which the colonies break up depends on the weather. In warmer, drier years, mating occurs earlier and colonies may break up as early as late January. In colder, wetter years, colony breakup can be delayed into March. Several generations may be produced during the spring and summer before adults begin their migration to overwintering sites. The adults mate just before leaving overwintering sites in mid- to late winter, and then disperse widely to areas where their host plant is present to lay eggs.

The western population of monarchs breeds in areas with milkweed throughout the United States west of the Rockies (Brower 1995), but virtually all of the overwintering sites used by the western population are located along the California coast, from northern Mendocino County south to San Diego County. Overwintering sites are almost always coastal, though small numbers of monarchs have been reported overwintering as far east as Inyo County (Lane 1993). Most sites are located within a half mile of the coast, in areas of dense tree cover where the butterflies are protected from the wind. Typical overwintering sites are found near natural



watercourses, and include areas at or near sea level in shallow canyons, gullies, or the leeward side of hills, where a combination of dense tree canopy, vegetation cover, and local topography provide strong wind protection (Lane 1993). Dense canopy cover also provides insulation from cold temperatures and protection from winter rains, both of which can cause lethal freezing in monarchs (Anderson and Brower 1996).

Although monarch overwintering sites do not receive specific protection under federal or state laws, in many cases they are protected locally by city or county ordinances. They are also included on CDFG's special animal list with a conservation status rank of G5S3 (globally secure; subnationally vulnerable). CDFG tracks the locations of Monarch overwintering sites through the California Natural Diversity Data Base (CNDDDB). Individual monarchs do not receive this consideration outside of overwintering sites. Other federal projects in the City of San Francisco, such as the Presidio Recycled Water Project, have included mitigation measures to protect monarch butterfly overwintering sites (Presidio Trust 2002).

#### ***4.3.1.2.2. Survey Results for Monarch Butterfly***

Two individual monarch butterflies were observed in flight during the site visit, within the BSA. Four reported monarch butterfly overwintering sites occur within five miles of the BSA, on Angel Island to the northwest, and within the city of San Francisco to the west (CDFG 2008a, Figure 5b). Suitable habitat for overwintering monarchs is present among the tall, wind-protected trees within the eucalyptus woodland and mixed broadleaf conifer forest in BSA (Figure 2). Based on the presence of suitable habitat and the known presence of individuals in the BSA, overwintering monarch butterflies are considered to utilize habitats within the BSA and have a moderate potential to roost within these habitats.

#### ***4.3.1.2.3. Avoidance and Minimization Measures for Monarch Butterfly***

Prior to the onset of construction activities, a qualified biologist will conduct focused surveys for monarch butterfly to determine presence or absence within the proposed project areas. If monarch butterfly winter roost sites are determined to be present during focused surveys, occupied habitat will be avoided to the extent feasible, or it will be disturbed outside of the winter roost season which is typically from September through March. ESA exclusion fencing will be placed around avoided habitats and contractor education will be conducted to prevent encroachment of construction activities. Bright colored ESA fencing and signage will be implemented and a construction monitor will confirm the fence integrity on a daily basis to protect the

area from accidental equipment damage. Fence repair and/or reinforcements will be completed immediately. If a new roost site is discovered during construction, the biological monitor will be contacted to implement avoidance procedures before construction resumes in the area. CDFG will be notified in the event a monarch butterfly winter roost site is found or disturbed.

#### ***4.3.1.2.4. Project Impacts on Monarch Butterfly***

Both project alternatives propose permanent and temporary impacts to eucalyptus woodland and mixed broadleaf conifer forest (Figures 6a and 6b) which provide potential habitat for monarch butterfly. The total area of potential impact to this habitat is small for each alternative:

- Alternative 4
  - eucalyptus woodland = 0.21 acre permanent, 1.19 acre temporary
  - mixed broadleaf conifer forest = 0.47 acre permanent, 1.29 acres temporary
- Alternative 2b
  - eucalyptus woodland = 0.26 acre permanent, 1.14 acre temporary
  - mixed broadleaf conifer forest = 0.82 acre permanent, 0.94 acre temporary

#### ***4.3.1.2.5. Compensatory Mitigation for Monarch Butterfly***

The SFCTA will offset the removal of eucalyptus woodland and mixed broadleaf conifer forest habitat that may provide roost sites for monarch butterfly by implementation of the woodland habitat revegetation plan as described in Section 1.2, as part of its Project Description. Trees removed will be replaced at a 1:1 ratio providing potential habitat that may benefit the species longer term. Compensatory mitigation is not proposed.

#### ***4.3.1.2.6. Cumulative Impacts for Monarch Butterfly***

In addition to the current project, several other construction projects are being undertaken or are in the planning stages in the immediate vicinity. These projects include the construction of the new SFOBB East Span, and the Treasure Island and YBI Redevelopment Plan. The combined construction efforts may temporarily reduce

availability of potential habitat for monarch butterflies on the eastern portion of YBI as well as the total available potential habitat on the island.

#### **4.3.1.3 GUMMIFERA LEAF-CUTTER BEE**

##### ***4.3.1.3.1. Life History and Habitat Requirements for Gummiifera Leaf-Cutter Bee***

The gummiifera leaf cutter bee (*Trachusa gummiifera*), a species tracked by the CNDDDB, has been reported to use the leaves on rosebushes (Crenshaw 1997, Kulzer 1996) as well as a number of native and nonnative plants for nest building activities. The gummiifera leaf cutter bee has been reported from San Francisco, San Mateo, and Marin Counties. This species is included on CDFG's special animal list with a conservation status rank of G1S1 (critically imperiled globally and subnationally).

##### ***4.3.1.3.2. Survey Results for Gummiifera Leaf-Cutter Bee***

Although the nearest known occurrence is over five miles to the southwest (CDFG 2008a), due to the presence of some potentially suitable plants within the landscaped portions of the BSA, including a row of roses, the gummiifera leaf-cutter bee is considered to have a very low potential to occur on-site.

##### ***4.3.1.3.3. Avoidance and Minimization Measures for Gummiifera Leaf-Cutter Bee***

Prior to the onset of construction activities, a qualified biologist will conduct focused surveys for gummiifera leaf-cutter bee to determine presence or absence within the proposed project areas. If any gummiifera leaf-cutter bees are determined to be present during focused surveys, occupied habitat will be avoided to the extent feasible. ESA exclusion fencing will be placed around avoided habitats and contractor education will be conducted to prevent encroachment of construction activities. Bright colored ESA fencing and signage will be implemented and a construction monitor will confirm the fence integrity on a daily basis to protect the area from accidental equipment damage. Fence repair and/or reinforcements will be completed immediately. If the species is discovered during construction, the biological monitor will be contacted to implement avoidance procedures before construction resumes in the area.

##### ***4.3.1.3.4. Project Impacts on Gummiifera Leaf-Cutter Bee***

Both project alternatives propose permanent and temporary impacts to landscaped/disturbed areas (Figures 6a and 6b) which may provide potential habitat



for gummifera leafcutter bee, including rose bushes. The total area of potential impact to this habitat is small for each alternative:

- Alternative 4
  - Landscaped/disturbed = 0.30 acre permanent, 0.58 acre temporary
- Alternative 2b
  - Landscaped/disturbed = 0.20 acre permanent, 0.67 acre temporary

#### **4.3.1.3.5. Compensatory Mitigation for Gummifera Leaf-Cutter Bee**

The SFCTA will offset removal of vegetation that may provide habitat for the gummifera leaf-cutter bee will be offset by implementing a revegetation plan as described in Section 1.2, as part of its Project Description. Vegetation removed, including nonnative trees, will be replaced at a 1:1 ratio providing potential habitat that may benefit the species longer term if it occurs in the area. Compensatory mitigation is not proposed,

#### **4.3.1.3.6. Cumulative Impacts for Gummifera Leaf-Cutter Bee**

In addition to the current project, several other construction projects are being undertaken or are in the planning stages in the immediate vicinity. These projects include the construction of the new SFOBB East Span, and the Treasure Island and YBI Redevelopment Plan. The combined construction efforts may temporarily reduce availability of potential habitat for gummifera leaf-cutter bees on the eastern portion of YBI as well as the total available potential habitat on the island.

### **4.3.1.4 SAN FRANCISCO LACEWING**

#### **4.3.1.4.1. Life History and Habitat Requirements for San Francisco lacewing**

The San Francisco lacewing (*Nothochrysa californica*), a species tracked by the CNDDDB, inhabits moist woodlands near the coast with live oak, bay, or pine. They are included on CDFG's special animal list with a conservation status rank of G1S1S3 (critically imperiled globally; critically imperiled to vulnerable subnationally).

#### **4.3.1.4.2. Survey Results for San Francisco lacewing**

The nearest known occurrence of the San Francisco lacewing is over five miles away, to the southwest (CDFG 2008a). Due to the presence of marginally suitable habitat within the BSA, the San Francisco lacewing is considered to have a very low potential to occur.

#### **4.3.1.4.3. Avoidance and Minimization Measures for San Francisco lacewing**

Prior to the onset of construction activities, a qualified biologist will conduct focused surveys for San Francisco lacewing to determine presence or absence within the proposed project areas. If any individuals are determined to be present during focused surveys, occupied habitat will be avoided to the extent feasible. ESA exclusion fencing will be placed around avoided habitats and contractor education will be conducted to prevent encroachment of construction activities. Bright colored ESA fencing and signage will be implemented and a construction monitor will confirm the fence integrity on a daily basis to protect the area from accidental equipment damage. Fence repair and/or reinforcements will be completed immediately. If the species is discovered during construction, the biological monitor will be contacted to implement avoidance procedures before construction resumes in the area.

#### **4.3.1.4.4. Project Impacts on San Francisco lacewing**

Both project alternatives propose permanent and temporary impacts to eucalyptus woodland and mixed broadleaf conifer forest (Figures 6a and 6b) which provide potential habitat for San Francisco lacewing. The total area of potential impact to this habitat is small for each alternative:

- Alternative 4
  - eucalyptus woodland = 0.21 acre permanent, 1.19 acre temporary
  - mixed broadleaf conifer forest = 0.47 acre permanent, 1.29 acres temporary
- Alternative 2b
  - eucalyptus woodland = 0.26 acre permanent, 1.14 acre temporary
  - mixed broadleaf conifer forest = 0.82 acre permanent, 0.94 acre temporary

#### **4.3.1.4.5. Compensatory Mitigation for San Francisco lacewing**

The SFCTA will offset the removal of eucalyptus woodland and mixed broadleaf conifer forest habitat that may provide habitat for San Francisco lacewing by implementing a woodland habitat revegetation plan as described in Section 1.2, as part of its Project Description. Trees removed will be replaced at a 1:1 ratio providing potential habitat that may benefit the species longer term. Compensatory mitigation is not proposed.

#### **4.3.1.4.6. Cumulative Impacts for San Francisco lacewing**

In addition to the current project, several other construction projects are being undertaken or are in the planning stages in the immediate vicinity. These projects include the construction of the new SFOBB East Span, and the Treasure Island and YBI Redevelopment Plan. The combined construction efforts may temporarily reduce availability of potential habitat for San Francisco lacewing on the eastern portion of YBI as well as the total available potential habitat on the island.

### **4.3.2. Discussion of Special-Status Fish**

A total of 9 special-status fish species were considered during the preparation of this report because the BSA falls within or in the vicinity of the historical range of these species, including:

- Green sturgeon – southern Distinct Population Segment (DPS) (*Acipenser medirostris*), federally listed threatened and a California Species of Special Concern
- Sacramento perch (*Archoplites interruptus*), a California Species of Special Concern
- Tidewater goby (*Eucyclogobius newberryi*), federally listed endangered and a California Species of Special Concern
- Delta smelt (*Hypomesus transpacificus*), federally and state-listed threatened
- Longfin smelt (*Spirinchus thaleichthys*), state-listed threatened
- Coho salmon – Central California ESU (Evolutionarily Significant Unit) (*Oncorhynchus kisutch*), federally and state-listed endangered
- Steelhead – Central California Coast ESU (*Oncorhynchus mykiss*), federally listed threatened



- Steelhead – Central Valley California ESU, federally listed threatened
- Chinook salmon – Central Valley spring-run ESU (*Oncorhynchus tshawytscha*), federally and state-listed threatened
- Chinook salmon – winter-run ESU, federally and state-listed threatened

#### **4.3.2.1 Survey Results for Special-Status Fish**

Leidy (2007) and Moyle (2002) consider the tidewater goby to be extirpated from San Francisco Bay and its tributaries. Delta smelt rarely occur in central or South San Francisco Bay and are normally restricted to areas north of San Pablo Bay (Moyle 2002). CH for Sacramento River winter-run Chinook, Central Valley spring-run Chinook, Central Coast coho, Central Valley steelhead is located in the Bay adjacent to the north side of the BSA. Furthermore, EFH is located in the Bay adjacent to the BSA for winter run Chinook, Central Valley spring run Chinook, Central Valley fall run Chinook, late fall run Chinook, and Central Coast coho (USDT - FHWA 2001, SFPD 2006). CH for California coastal steelhead is also located to the south of the BSA. Although the BSA is located immediately adjacent to the Bay, the only aquatic habitat present within the BSA are concrete lined drainage swales adjacent to roadsides. These features are designed to convey stormwater (therefore they are intermittent), a few feet wide, and unvegetated. They do not provide habitat for the special-status fish species that have potential to occur in the adjacent waters of the Bay. Based on the absence of suitable aquatic habitat, no fish species are expected to occur on-site (see Appendix A).

#### **4.3.2.2 Project Impacts on Special-Status Fish**

Project construction activities that involve loud equipment such as pile driving have the potential to cause barotrauma to fish species occurring within waters adjacent to the site. However, none of these activities will occur within aquatic habitats. All construction activities, including pile driving of piers for installation of the ramps, will occur on land in soils that are not saturated. H-piles (steel piles) will be driven into the ground; the other type of piles to be used are concrete piles which are to be placed, not driven (a hole is augered and the concrete is placed inside). The closest H-piles will be driven approximately 300 feet from the shoreline under Alternative 2B and 90 feet from the shoreline under Alternative 4. The primary source of underwater noise would be ground borne vibration released into the bay. Illingworth & Rodkin, Inc. prepared a hydro-acoustic analysis for pile driving activities under both project alternatives (Illingworth & Rodkin, Inc. 2011a). Predictions for distances to adopted NMFS, USFWS, and CDFG (FHWG 2008) injury threshold criteria were made using

actual measurements taken by Illingworth & Rodkin, Inc. from similar pile driving experiences. Injury threshold criteria for fish are as follows:

- Peak Sound Pressure, unweighted (dB)  
206 dB re: 1  $\mu$ Pa (for all size of fish)
- Cumulative Sound Exposure Level (SEL), dB re 1  $\mu$ Pa<sup>2</sup> sec  
187 dB re: 1  $\mu$ Pa<sup>2</sup>-sec – for fish size of two grams or greater.  
183 dB re: 1  $\mu$ Pa<sup>2</sup>-sec – for fish size of less than two grams.

NMFS does not consider events that produce a SEL per strike of less than 150 dB to accumulate and cause injury. The data used in Illingworth & Rodkin, Inc.'s analysis is based primarily on data measured for installation of a temporary crane platform on YBI in November 2008. Therefore soil types and transmission loss through the soils would be similar to the project area, providing a reasonable comparison. For the crane platform, piles were driven approximately 40 feet from the water's edge producing maximum underwater sound levels of 174 dB peak and 147 dB SEL at underwater measurement locations of 131 feet. This was the closest location that measurements could be made due to the shallowness of the water. The closest pile for Alternative 4 is located 90 feet from the shoreline. Given that this pile will be farther away from fisheries habitat than those installed for the crane platform, underwater noise levels are expected to be even lower for construction of the YBI Ramps under both alternatives. Thus, project construction noise levels are not expected to reach the minimum established injury threshold of 183 dB SEL or 206 dB peak for fish (Illingworth & Rodkin, Inc. 2011a).

The project is designed so that construction activities are located an adequate distance from the bay and therefore fish would not be affected by construction activities. Construction noise levels, including pile driving, would be well below established thresholds to avoid potential injury to fish located in aquatic habitats adjacent to the site.

#### ***4.3.2.3 Avoidance and Minimization Measures for Special-Status Fish***

Implementation of BMP's during construction as described in Section 4.1.1.2 will minimize potential water quality impacts to waters of the Bay and avoid indirect impacts to critical habitat and Essential Fish Habitat adjacent to the site.

#### **4.3.2.4 Compensatory Mitigation for Special-Status Fish**

Based on the hydroacoustic analysis, the project would not result in the loss of any Essential Fish Habitat or Critical Habitat. Avoidance and minimization or compensatory measures are not proposed.

#### **4.3.2.5 Cumulative Impacts for Special-Status Fish**

It is unlikely that the project would have an adverse cumulative effect on special-status fish as there are no components of the project that are in occur in the waters of the Bay and fish habitat is not present on site. There are several other projects in the immediate vicinity that are on-going or proposed and when combined cumulative water quality impacts could be significant. However, all projects are implementing BMP's to minimize potential impacts to the water quality of the Bay.

#### **4.3.3. Discussion of Special-Status Reptiles and Amphibians**

A total of 3 special-status amphibian species and 7 special-status reptile species were considered during the preparation of this report because the BSA falls within or in the vicinity of the historical range of these species. These include:

- California tiger salamander (*Ambystoma californiense*), federally listed threatened and a California Species of Special Concern
- California red-legged frog (*Rana* [= *aurora draytonii*] *draytonii*), federally listed threatened and a California Species of Special Concern
- Foothill yellow-legged frog (*Rana boylei*), a California Species of Special Concern
- Western pond turtle (*Actinemys* [= *Clemmys*] *marmorata*), a California Species of Special Concern
- Loggerhead turtle (*Caretta caretta*), federally listed threatened
- Green turtle (*Chelonia mydas*), federally listed threatened
- Leatherback (*Dermochelys coriacea*), federally listed endangered
- Olive ridley sea turtle (*Lepidochelys olivacea*), federally listed threatened
- Alameda whipsnake (*Masticophis lateralis euryxanthus*), federally and state-listed threatened



- San Francisco garter snake (*Thamnophis sirtalis tetrataenia*), federally and state-listed endangered and a California Fully Protected Species

Of these 10 species, all were eliminated from consideration due to their range, isolation from known populations, or lack of suitable habitat. The BSA lacks freshwater aquatic habitat in the form of streams or ponds, making it unsuitable for California tiger salamander, California red-legged frog, foothill yellow legged frog, western pond turtle, and San Francisco garter snake. The concrete lined drainages are not considered suitable habitat for these species due to lack of cover, suitable substrate, and ponded water. The fact that YBI is an island also isolates it from all known populations of these species, as well as populations of Alameda whipsnake (Figure 5b). The four species of sea turtle range very widely throughout the Pacific and other oceans, are typically found far out to sea during migrations, forage in suitable nearshore habitats, and lay their eggs on suitable beaches. Sea turtles do not nest in California, and although they may occur in coastal waters, sea turtles are not expected to enter the San Francisco Bay. There are no reported observations in the Bay and higher quality foraging opportunities are present in coastal waters and lagoons outside of the Bay. Therefore, they are not expected to occur within the waters adjacent to the project area (see Appendix A).

#### 4.3.4. Discussion of Special-Status Raptors

Most raptors, such as golden eagle (*Aquila chrysaetos*), white-tailed kite, red-tailed hawk, red-shouldered hawk, and Cooper's hawk (*Accipiter cooperii*), nest in mature, large coniferous or deciduous trees and use twigs or branches as nesting material. Smaller raptors such as American kestrel (*Falco sparverius*) and western screech-owl (*Otus kennicottii*) may nest in cavities in anthropogenic structures and trees. Short-eared owl (*Asio flammeus*), and northern harrier (*Circus cyaneus*), nest on the ground in grassland, marshes, and agricultural fields with tall vegetation. Western burrowing owl (*Athene cunicularia hypugaea*) typically nest in small mammal burrows in open dry lands, but have been known to utilize any ground cavity of similar size as well as anthropogenic structures. Common raptors such as American kestrel, great horned owl, common barn owl (*Tyto alba*), Cooper's hawk, and red-tailed hawk could nest on-site and are afforded protection under the MBTA and CDFG code. The nesting period for raptors generally occurs between December 15 and August 31.

A total of eight special-status raptor species were considered during the preparation of this report because the BSA falls within or in the vicinity of the historical range of these species, including:

- Cooper's hawk, a CDFG Watch List species
- Golden eagle, a CDFG Watch List species and California Fully Protected species
- Western burrowing owl, a California Species of Special Concern
- Northern harrier, a California Species of Special Concern
- White-tailed kite, a California Fully Protected species
- American peregrine falcon, a California Fully Protected species
- Bald eagle (*Haliaeetus leucocephalus*), state-listed endangered and a California Fully Protected species
- Osprey (*Pandion haliaetus*), a CDFG Watch List species

Four of these species are not expected to occur or nest on-site. Although the closest known occurrence of western burrowing owl is less than four miles to the southeast, on Alameda Island (S. Euing 2007, 2008a, 2008b) (Figure 5b), based on the isolation of the island from suitable open habitat areas and lack of such habitat on-site, western burrowing owl is not expected to occur. Northern harrier has been reported to occur within five miles to the northeast of the BSA; however, due to a lack of open grassland, marsh, or agricultural habitats on-site, northern harrier is not expected to occur on-site. The nearest reported occurrence of bald eagle is over five miles away (CDFG 2008a). Bald eagle pairs have recently established nest sites on watershed lands adjacent to Bay Area reservoirs including Calaveras, Del Valle, and San Pablo; however they are not known to nest in trees or structures adjacent to the Bay preferring lands with minimized human activity. Therefore, bald eagles are not expected to occur on-site (see Appendix A). Similarly, osprey may occasionally forage in the Bay adjacent to the BSA, and although they are also known to nest on Bay Area water shed lands adjacent to reservoirs, they are not expected to use the BSA for nesting.

The large trees within the eucalyptus woodland and mixed forest on-site including coastal redwood, coast live oak, Monterey pine, eucalyptus, acacia, and canary palms (*Phoenix canariensis*) provide suitable nesting habitat for Cooper's hawk, white-tailed kite, and golden eagle as well as common raptor species such as red-tailed hawk and great horned owl. Large trees within landscaped areas also provide potential raptor nesting habitat. Furthermore, the SFOBB structure within and adjacent to the project

area provides suitable nesting habitat for American peregrine falcon. See Table 2 for the potential for each of these species to occur on-site.

Because of their prominence in today's regulatory environment and/or the likelihood that they could occur on-site, Cooper's hawk, golden eagle, white-tailed kite, and American peregrine falcon are addressed in further detail below.

#### **4.3.4.1 COOPER'S HAWK**

##### ***4.3.4.1.1. Life History of Cooper's Hawk***

Cooper's hawk is a medium sized raptor distributed year-round throughout California, and much of the contiguous United States. Cooper's hawk occupies open forested areas, oak woodland, and riparian areas, nesting in conifers or deciduous trees. Primarily an ambush hunter, Cooper's hawks feed on small birds and mammals, and on occasion, fish (Alsop 2001). Cooper's hawks lay four to six eggs per year, with chicks hatching after 32-36 days. This species is found in residential areas in portions of the Bay Area, especially in the East Bay, where they are becoming increasingly common (Pericoli & Fish 2004). They have been known to hunt near houses, backyard ponds, and bird feeders.

##### ***4.3.4.1.2. Survey Results for Cooper's Hawk***

The nearest known occurrence is approximately five miles to the east within the city of Oakland (CDFG 2008a). The common birds and mammals which occur on-site provide a potential prey base. Based upon the relatively close proximity to known occurrences and the suitable nest trees present within the landscaped areas, eucalyptus woodland, and mixed forest found on portions of the site, Cooper's hawk is considered to have a moderate potential to occur.

##### ***4.3.4.1.3. Avoidance and Mitigation Efforts for Cooper's Hawk***

Cooper's hawks have the potential to nest within habitats on-site. Any removal of trees, buildings, or other structures, or construction activities within the vicinity of active raptor nests could result in nest abandonment, nest failure, or premature fledging. Destruction or disturbance of active nests would be in violation of the MBTA and Fish and Game Code. Therefore, the following measures will be implemented to avoid project related impacts to potentially nesting raptors:

1. To the extent feasible, potential nest trees will be avoided.



2. To the extent feasible, the necessary removal of any trees or structures will occur from September 1 through December 15, outside the breeding season. If removal of trees or structures occurs, or construction begins between December 15 and August 31 (the nesting season), a nesting bird survey will be performed by a qualified biologist within 15 days prior to the removal of potential nesting trees or structures, or prior to disturbance of areas in the vicinity of potential nest sites
3. All trees or structures with active nests will be flagged and a non-disturbance buffer zone established around the nest site in coordination with CDFG. Additionally, if any nests are found on the SFOBB or other structures within the project area or within 500 feet of the project area boundary, these nests shall be flagged and a non-disturbance buffer zone established. Buffer zones typically range between 200 feet to 500 feet depending on the species involved, site conditions, nesting stage, and type of work in proximity. Contractor education will be conducted for nesting bird avoidance. Observations will be conducted by a qualified biologist to confirm that work occurring outside of the buffer zone is not disturbing nesting pairs. If necessary, buffer zones will be adjusted to reduce distress to birds.
4. Active nests will be regularly monitored by a qualified biologist to determine when the young have fledged and are feeding on their own. CDFG will be consulted for clearance before construction activities resume within the buffer zone. CDFG will be notified if any nest is disturbed.
5. ESA exclusion fencing will be placed around avoided habitats and contractor education will be conducted to prevent encroachment of construction activities. Bright colored ESA fencing and signage will be implemented and a construction monitor will confirm the fence integrity on a daily basis to protect the area from accidental equipment damage. Fence repair and/or reinforcements will be completed immediately. If a new nest site is discovered during construction, the biological monitor will be contacted to implement avoidance procedures, in coordination with CDFG, before construction resumes in the area.

#### **4.3.4.1.4. Project Impacts on Cooper's Hawk**

Project construction activities have the potential to disturb Cooper's hawks that attempt nesting within the project area and those that may be nesting adjacent to the

site. Under both project alternatives, temporary and permanent project impacts are proposed to eucalyptus woodland and mixed broadleaf conifer forest. Removal of trees will result in a loss of potential Cooper's hawk nesting habitat. Under proposed Alternative 4 approximately 0.68 acre of woodland and forest habitat will be permanently affected by placement of the ramp structures and approximately 2.48 acres will be temporarily disturbed for construction staging and access. Under proposed Alternative 2b approximately 1.08 acre of woodland and forest habitat will be permanently affected by placement of the ramp structures and approximately 2.08 acres will be temporarily disturbed for construction staging and access.

#### **4.3.4.1.5.      *Compensatory Mitigation for Cooper's Hawk***

Temporarily disturbed woodland and forested areas will be restored after completion of construction activities. The SFCTA will offset the removal of eucalyptus woodland and mixed broadleaf conifer forest habitat that may provide nest sites for Cooper's hawk by implementing a woodland habitat revegetation plan as described in Section 1.2, as part of its Project Description. Trees removed will be replaced at a minimum 1:1 ratio, with natives to the island replaced at a 3:1 ratio. Compensatory mitigation is not proposed.

#### **4.3.4.1.6.      *Cumulative Impacts on Cooper's Hawk***

In addition to the current project, several other construction projects are being undertaken or are in the planning stages in the immediate vicinity. These projects include the construction of the new SFOBB East Span, and the Treasure Island and YBI Redevelopment Plan. The combined construction efforts may temporarily reduce nesting success of Cooper's hawk on the eastern portion of YBI as well as the total available woodland habitat on the island.

#### **4.3.4.2.      GOLDEN EAGLE**

##### **4.3.4.2.1.      *Life History of Golden Eagle***

Golden eagle is a large raptor that is widely distributed throughout western North America. Primarily found in grasslands and open mountainous areas, golden eagles are solitary birds that nest on cliff ledges and tall trees, and feed primarily on small mammals. Golden eagles nest throughout the hills of the East Bay and prefer remote nest sites with a low level of human disturbance.

#### **4.3.4.2.2. Survey Results for Golden Eagle**

Large trees within the wooded portions of the site provide potential nesting habitat although these areas are adjacent to heavy and regular disturbances from SFOBB construction activities, boat, and SFOBB traffic. The nearest recorded occurrence is approximately ten miles to the east (CDFG 2008a), and due to the on-going site disturbances, golden eagle is considered to have a very low potential to occur.

#### **4.3.4.2.3. Avoidance and Mitigation Efforts for Golden Eagle**

Golden eagles have the potential to nest within habitats on-site. Any removal of trees, buildings, or other structures, or construction activities within the vicinity of active raptor nests could result in nest abandonment, nest failure, or premature fledging. Destruction or disturbance of active nests would be in violation of the MBTA and Fish and Game Code. Therefore, the following measures will be implemented to avoid project related impacts to potentially nesting raptors:

1. To the extent feasible, potential nest trees will be avoided.
2. To the extent feasible, the necessary removal of any trees or structures will occur from September 1 through December 15, outside the breeding season. If removal of trees or structures occurs, or construction begins between December 15 and August 31 (the nesting season), a nesting bird survey will be performed by a qualified biologist within 15 days prior to the removal of potential nesting trees or structures, or prior to disturbance of areas in the vicinity of potential nest sites
3. All trees or structures with active nests will be flagged and a non-disturbance buffer zone established around the nest site in coordination with CDFG. Additionally, if any nests are found on the SFOBB or other structures within the project area or within 500 feet of the project area boundary, these nests shall be flagged and a non-disturbance buffer zone established. Buffer zones typically range between 200 feet to 500 feet depending on the species involved, site conditions, nesting stage, and type of work in proximity. Contractor education will be conducted for nesting bird avoidance. Observations will be conducted by a qualified biologist to confirm that work occurring outside of the buffer zone is not disturbing nesting pairs. If necessary, buffer zones will be adjusted to reduce distress to birds.



4. Active nests will be regularly monitored by a qualified biologist to determine when the young have fledged and are feeding on their own. CDFG will be consulted for clearance before construction activities resume within the buffer zone. CDFG will be notified if any nest is disturbed.
5. ESA exclusion fencing will be placed around avoided habitats and contractor education will be conducted to prevent encroachment of construction activities. Bright colored ESA fencing and signage will be implemented and a construction monitor will confirm the fence integrity on a daily basis to protect the area from accidental equipment damage. Fence repair and/or reinforcements will be completed immediately. If a new nest site is discovered during construction, the biological monitor will be contacted to implement avoidance procedures, in coordination CDFG, before construction resumes in the area.

#### **4.3.4.2.4. Project Impacts on Golden Eagle**

Project construction activities have the potential to disturb golden eagles that attempt nesting within the project area and those that may be nesting adjacent to the site. Under both project alternatives, temporary and permanent project impacts are proposed to eucalyptus woodland and mixed broadleaf conifer forest. Removal of trees will result in a loss of potential golden eagle nesting habitat. Under proposed Alternative 4 approximately 0.68 acre of woodland and forest habitat will be permanently affected by placement of the ramp structures and approximately 2.48 acres will be temporarily disturbed for construction staging and access. Under proposed Alternative 2b approximately 1.08 acre of woodland and forest habitat will be permanently affected by placement of the ramp structures and approximately 2.08 acres will be temporarily disturbed for construction staging and access.

#### **4.3.4.2.5. Compensatory Mitigation for Golden Eagle**

Temporarily disturbed woodland and forested areas will be restored after completion of construction activities. The SFCTA will offset the removal of eucalyptus woodland and mixed broadleaf conifer forest habitat that may provide nest sites for golden eagle by implementing a woodland habitat revegetation plan as described in Section 1.2, Project Description. Trees removed will be replaced at a minimum 1:1 ratio, with natives to the island replaced at a 3:1 ratio. Compensatory mitigation is not proposed.

#### **4.3.4.2.6. Cumulative Impacts on Golden Eagle**

In addition to the current project, several other construction projects are being undertaken or are in the planning stages in the immediate vicinity. These projects include the construction of the new SFOBB East Span, and the Treasure Island and YBI Redevelopment Plan. The combined construction efforts may temporarily reduce nesting success of golden eagles on the eastern portion of YBI as well as the total available woodland habitat on the island.

#### **4.3.4.3 WHITE-TAILED KITE**

##### **4.3.4.3.1. Life History of White-Tailed Kite**

White-tailed kite is a medium-sized raptor that is distributed across much of the western part of California. The white-tailed kite occupies low-elevation grassland, agricultural, wetland, oak woodland, and savanna habitats and nests in a wide variety of trees and shrubs, either isolated or in larger stands. Nearby open areas are required for foraging, including certain types of agricultural fields. Food habit studies have demonstrated that voles make up a large proportion of its diet, although other small mammals, birds and insects are also preyed upon (Alsop 2001). This species hunts during the day primarily by hovering and searching for prey. White-tailed kites in California are generally resident, although they may occupy different areas during the non-breeding and breeding seasons. Typically, four eggs are laid in February and March and chicks hatch after 30-32 days. Juveniles are dependent on parents for two to three months before they fledge. During the non-breeding season, this species roosts communally.

##### **4.3.4.3.2. Survey Results for White-Tailed Kite**

Suitable nesting habitat for white-tailed kite is present within the mixed broadleaf conifer forest located on the northeast side of the BSA, and the closest documented occurrence is within five miles to the northeast (CDFG 2008a). With its placement up against the hillside, the forested area is somewhat buffered from the construction and traffic activity to the southwest. White-tailed kites are relatively tolerant of human disturbances if suitable trees are available for nesting providing adequate shelter, noise buffers, and wind protection. Trees within the forest are well developed with adequate limbs and canopy for nesting. Common rodents present on-site provide an adequate prey base. Therefore, white tailed kites are considered to have a moderate potential to occur on-site.

**4.3.4.3.3. Avoidance and Mitigation Efforts for White-Tailed Kite**

White-tailed kites have the potential to nest within habitats on-site. Any removal of trees, buildings, or other structures, or construction activities within the vicinity of active raptor nests could result in nest abandonment, nest failure, or premature fledging. Destruction or disturbance of active nests would be in violation of the MBTA and Fish and Game Code. Therefore, the following measures will be implemented to avoid project related impacts to potentially nesting raptors:

1. To the extent feasible, potential nest trees will be avoided.
2. To the extent feasible, the necessary removal of any trees or structures will occur from September 1 through December 15, outside the breeding season. If removal of trees or structures occurs, or construction begins between December 15 and August 31 (the nesting season), a nesting bird survey will be performed by a qualified biologist within 15 days prior to the removal of potential nesting trees or structures, or prior to disturbance of areas in the vicinity of potential nest sites
3. All trees or structures with active nests will be flagged and a non-disturbance buffer zone established around the nest site in coordination with CDFG. Additionally, if any nests are found on the SFOBB or other structures within the project area or within 500 feet of the project area boundary, these nests shall be flagged and a non-disturbance buffer zone established. Buffer zones typically range between 200 feet to 500 feet depending on the species involved, site conditions, nesting stage, and type of work in proximity. Contractor education will be conducted for nesting bird avoidance. Observations will be conducted by a qualified biologist to confirm that work occurring outside of the buffer zone is not disturbing nesting pairs. If necessary, buffer zones will be adjusted to reduce distress to birds.
4. Active nests will be regularly monitored by a qualified biologist to determine when the young have fledged and are feeding on their own. CDFG will be consulted for clearance before construction activities resume within the buffer zone. CDFG will be notified if any nest is disturbed.
5. ESA exclusion fencing will be placed around avoided habitats and contractor education will be conducted to prevent encroachment of construction activities. Bright colored ESA fencing and signage will be implemented and a construction monitor will confirm the fence integrity on a daily basis to



protect the area from accidental equipment damage. Fence repair and/or reinforcements will be completed immediately. If a new nest site is discovered during construction, the biological monitor will be contacted to implement avoidance procedures, in coordination with CDFG, before construction resumes in the area.

**4.3.4.3.4. Project Impacts on White-Tailed Kite**

Project construction activities have the potential to disturb white-tailed kites that attempt nesting within the project area and those that may be nesting adjacent to the site. Under both project alternatives, temporary and permanent project impacts are proposed to eucalyptus woodland and mixed broadleaf conifer forest. Removal of trees will result in a loss of potential white-tailed kite nesting habitat. Under proposed Alternative 4 approximately 0.68 acre of woodland and forest habitat will be permanently affected by placement of the ramp structures and approximately 2.48 acres will be temporarily disturbed for construction staging and access. Under proposed Alternative 2b approximately 1.08 acre of woodland and forest habitat will be permanently affected by placement of the ramp structures and approximately 2.08 acres will be temporarily disturbed for construction staging and access.

**4.3.4.3.5. Compensatory Mitigation for White-Tailed Kite**

Temporarily disturbed woodland and forested areas will be restored after completion of construction activities. The SFCTA will offset the removal of eucalyptus woodland and mixed broadleaf conifer forest habitat that may provide nest sites for white-tailed kite by implementing a woodland habitat revegetation plan as described in Section 1.2, Project Description. Trees removed will be replaced at a minimum 1:1 ratio, with natives to the island replaced at a 3:1 ratio. Compensatory mitigation is not proposed.

**4.3.4.3.6. Cumulative Impacts on White-Tailed Kite**

In addition to the current project, several other construction projects are being undertaken or are in the planning stages in the immediate vicinity. These projects include the construction of the new SFOBB East Span, and the Treasure Island and YBI Redevelopment Plan. The combined construction efforts may temporarily reduce nesting success of white-tailed kites on the eastern portion of YBI as well as the total available woodland habitat on the island.

#### 4.3.4.4 AMERICAN PEREGRINE FALCON

##### 4.3.4.4.1 *Life History of American Peregrine Falcon*

The peregrine falcon is one of the most widely spread bird species, found on all continents except Antarctica. In California, the peregrine falcon is found year-round along the coast from the Oregon border south to Pt. Conception (Sibley 2003). Peregrine falcons require open areas for foraging, and for nesting uses cliffs in isolated areas, or bridges and buildings in urban areas. Other potential but rare nest sites include abandoned nests of ravens, hawks, or cormorants. Peregrine falcons generally begin nesting in late March, laying between three and four eggs per clutch. Incubation lasts approximately 33 days, during which time the female incubates while the males forages and brings food back to the nest. Peregrine falcons will re-nest if the first attempt is unsuccessful. The peregrine falcon is known for its high speed flight; it is a foraging specialist, feeding primarily on birds ranging in size from swallows to small ducks or pigeons, which it often catches in flight.

Listed in 1973 as an endangered species under the FESA, the peregrine was delisted in 1999 after a successful recovery program that included banning DDT and other chlorinated hydrocarbons, protection from shooting and trapping, and captive breeding. The species was delisted under the CESA in 2009, but it retains its status as a Fully Protected Species. At its lowest, the population had been reduced to several hundred breeding pairs in the USA, and only two of these nested in California in 1970; now the population numbers approximately 2,000 breeding pairs, with 271 active breeding sites known in California as of 2006 (SCPBRG 2009).

Peregrine falcons have been known to nest in urban areas within the Bay Area, with pairs nesting in San Jose, Redwood Shores, and San Francisco. The peregrines in San Jose have nested on the city hall building in 2007, 2008, and 2009, and have successfully fledged three to four offspring each of those years. The peregrines in Redwood Shores nested on the roof of building 400 on the Oracle campus from 2000 to 2002 and again in 2007. In 2007 the Oracle peregrines successfully fledged four offspring. The peregrines in downtown San Francisco nested on the Pacific Gas and Electric (PGE) building from 2003 until 2005, successfully fledging two offspring in 2004 and three offspring in 2005. The peregrines that had nested on the PGE building in downtown San Francisco moved temporarily to an adjacent building in 2006, fledging a single offspring, and to the west span of the SFOBB in 2007 producing two viable eggs, which were collected and incubated by Santa Cruz Predatory Bird Research Group (SCPBRG) biologists. Of the two viable eggs, only one survived to



fledging. In 2007, the peregrines returned to the PGE building for a second nesting attempt, which produced a second successful hatchling (SCPBRG 2009 a). A different pair of peregrines successfully nested at the PGE building in 2009. However, shortly after fledgling, one fledgling was killed when it hit a skyscraper window, a second was severely injured and taken into captivity for rehabilitation, and the third disappeared and may have successfully left the area (SCPBRG 2009b).

#### **4.3.4.4.2. Survey Results for American Peregrine Falcon**

Peregrine falcons are known to nest on existing piers on the SFOBB (Woodward-Clyde 1998, USDT - FHWA 2001), and known peregrine nesting areas on the SFOBB are currently being monitored as part of the mitigation requirements for the SFOBB East Span Seismic Safety Plan (LSA 2003). The peregrines nested on pier E3, located approximately 1,600 feet east of the BSA, in 2004 and 2007, and on pier E2, located approximately 260 feet east of the BSA, in 2005 and 2006 (Parsons Brinkerhoff Quade & Douglas 2004, 2005, 2006, 2007 and 2008). In 2004 and 2005 the nesting attempts failed, and no viable offspring were produced (Parsons Brinkerhoff Quade & Douglas 2004, 2005). In 2006, a first nesting attempt in March failed, however a second nesting attempt in June produced a single hatchling, which was removed from the nest by SCPBRG biologists on July 31 (Parsons Brinkerhoff Quade & Douglas 2006). In 2007, the peregrines successfully hatched two eggs, which were removed from the nest by SCPBRG biologists on May 15. The falcons did not attempt to nest on the east span of the SFOBB in 2008. A pair of peregrine falcons, nested and hatched two chicks on the west span of the SFOBB in April of 2008, however the chicks did not successfully fledge. In May 2009, a pair of peregrine falcons successfully hatched three chicks at the pier E2 nesting site on the existing SFOBB. All three nestlings fledged in June of 2009. Two of the three juveniles were observed flying and roosting repeatedly on and around the existing and new SFOBB. The third juvenile was not observed since fledging on June 18, 2009 (LSA 2009). While there are several structures within the BSA, none of them provide the cliff-like habitat preferred by peregrine falcons. Furthermore, the portion of the SFOBB structure that is within the BSA does not have the unobstructed views, or high ledges that would make it likely appealing to a nesting peregrine falcon. Therefore, it is unlikely that peregrine falcons would nest within the BSA. However, due to the close proximity of known past nesting sites on the eastern span SFOBB piers, and the availability of adequate foraging habitat on-site, the peregrine falcon is considered to have a high potential to occur and forage on-site.



**4.3.4.4.3.      *Avoidance and Mitigation Efforts for American Peregrine Falcon***

Peregrine falcons have the potential to nest in close proximity to the BSA, and have a high potential to use the BSA for foraging. Construction activities within the vicinity of active raptor nests could result in nest abandonment, nest failure, or premature fledging. Destruction or disturbance of active nests would be in violation of the MBTA and Fish and Game Code. In addition, due to its Fully Protected status under Fish and Game Code, incidental take of individuals or nests is not authorized. Therefore, the following measures will be implemented to avoid project related impacts to potentially nesting peregrine falcons:

1. Throughout project construction, monitoring of the potential peregrine falcon nest sites on the piers of the existing SFOBB will be continued following the methodology outlined in the Final Revised Bird Monitoring and Management Plan (LSA 2003).
2. If removal of structures occurs, or construction begins between December 15 and August 31 (the nesting season), a nesting bird survey will be performed by a qualified biologist within 15 days prior to the removal of potential nesting structures, or prior to disturbance of areas in the vicinity of potential nest sites.
3. If an active peregrine falcon nest is discovered on the SFOBB or other structures within the project area or within 1,500 feet of the project area boundary, a non-disturbance buffer zone will be established in coordination with CDFG, as appropriate. Contractor education will be conducted by a qualified biologist for nesting bird avoidance. Observations will be conducted by a qualified biologist to confirm that work occurring outside of the buffer zone is not disturbing the nesting pair. If necessary, buffer zones will be adjusted to reduce distress to birds.
4. The CDFG will be consulted for clearance before construction activities resume within the buffer zone. CDFG will be notified if any nest is disturbed.

**4.3.4.4.4.      *Project Impacts on American Peregrine Falcon***

Project construction activities have the potential to disturb peregrine falcons that attempt nesting within the project area and those that may be nesting adjacent to the site. Construction related noise and vibration could potentially impact the success of

nests that are within line of site or near enough to disturb the normal activities of the adult birds.

#### **4.3.4.4.5.      *Compensatory Mitigation for American Peregrine Falcon***

No compensatory mitigation is proposed for this species.

#### **4.3.4.4.6.      *Cumulative Impacts on American Peregrine Falcon***

In addition to the current project, several other construction projects are being undertaken or are in the planning stages in the immediate vicinity. These projects include the construction of the new SFOBB East Span, and the Treasure Island and YBI Redevelopment Plan. The combined construction efforts may cause peregrine falcons to abandon nesting attempts on the SFOBB. However, peregrine nest sites on urban buildings in the region have been more successful than bridge nests in number of successfully fledged chicks. Given the ability of this species to utilize a variety of urban structures for nesting the project is not anticipated to contribute to negative cumulative effects on the population.

### **4.3.5.      Discussion of Special Status Birds (Non-Raptors)**

A total of 24 non-raptor special-status bird species were considered during the preparation of this report because the BSA falls within or in the vicinity of the historical range of these species. Based on the location of the site (beyond the species current range) or absence of suitable habitat, 14 of these species are not expected to occur (see Appendix A). Several of these species including the California brown pelican (*Pelecanus occidentalis californicus*), a California Fully Protected species, and double-crested cormorant (*Phalacrocorax auritus*), a CDFG Watch List species, are discussed below in more detail.

#### **4.3.5.1.      PASSERINES AND NON-PASSERINE LANDBIRDS**

##### **4.3.5.1.1.      *Life History for Passerines and Non-Passerine Landbirds***

Passerines (perching birds) are a taxonomic grouping that consists of several families including swallows (Hirundinidae), larks (Alaudidae), crows, ravens and jays (Corvidae), shrikes (Laniidae), vireos (Vireonidae), finches (Fringillidae) and Emberizids (Emberizidae; warblers, sparrows, blackbirds, etc.), among others. Non-passerine land birds are a non-taxonomic based grouping typically used by ornithologists to categorize a loose assemblage of birds. Families grouped into this category include kingfishers (Alcedinidae), woodpeckers (Picidae), swifts

(Apodidae), hummingbirds (Trochilidae), and pigeons and doves (Columbidae), among others.

Habitat, nesting, and foraging requirements for these species are wide ranging, therefore outlining generic habitat requirements for this grouping is difficult. These species typically use most habitat types and are known to nest on the ground, in shrubs and trees, on buildings, under bridges, and within cavities, crevices, and manmade structures. Many of these species migrate long distances and all species except starlings, English house sparrows, and rock doves (pigeons), are protected under the federal MBTA and Fish and Game Code. The nesting period for non-raptors occurs between February 1 and August 31.

Mature woodlands and scrub communities provide ample nesting and foraging habitats for a wide variety of species including sparrows, scrub jays, crows, warblers, bushtits, and hummingbirds. Allen's hummingbird (*Selasphorus sasin*), a species tracked by the CNDDDB, has a moderate potential to nest within natural and landscaped vegetation found throughout the BSA.

#### **4.3.5.1.2. Survey Results for Passerines and Non-Passerine Landbirds**

Several common passerine and non-passerine landbird species could nest within habitats present on-site including natural vegetation, structures, and disturbed areas. Ruderal, disturbed, landscaped and grassland areas could provide nesting habitat for such opportunistic birds as killdeer, as well as foraging habitat for a wide variety of birds. Structures within the BSA such as the existing SFOBB structure provide nesting habitat for species such as house finch and barn swallow. Exposed vertical banks such as are found on the northern boundary of the BSA provide potential nesting habitat for species such as bank swallow (*Riparia riparia*), state-listed threatened, which excavate tunnel nests into exposed sandbanks. Nesting bank swallows have not been recorded at YBI and the closest known nest colony is located approximately 9 miles southwest at Fort Funston/Lake Merced (Garrison 1998). Alameda song sparrow (*Melospiza melodia pusillula*), a California species of special concern, nests in tidal marsh habitat and uses this habitat year-round. This species has been reportedly observed foraging on-site (USDT - FHWA 2001), however this occurrence is not noted in the CNDDDB, and there is no suitable nesting habitat within the BSA. Because the song sparrow subspecies are difficult to visually tell apart, except by habitat use and location, the song sparrow seen at YBI may have been the upland subspecies, not Alameda song sparrow. Therefore while Alameda song



sparrow is considered to have a moderate potential to occur, it is not expected to nest within the BSA.

**4.3.5.1.3. Avoidance and Mitigation Measures for Passerines and Non-Passerine Landbirds**

Several special-status and common passerine and non-passerine landbirds, listed above, have at least some potential to nest and forage on-site. Any removal of structures, trees or shrubs, or construction activities in the vicinity of active nests could result in nest abandonment, nest failure, or premature fledging. Destruction or disturbance of active nests would be in violation of the MBTA and Fish and Game Code. Therefore, the following measures will be implemented to avoid project related impacts to potentially nesting passerine and non-passerine landbirds:

1. The removal of any structures, trees or shrubs will occur from September 1 through February 1, outside the passerine and non-passerine landbird breeding season. If removal of trees or shrubs occurs, or construction begins between February 1 and August 31 (the nesting season), a nesting bird survey will be performed by a qualified biologist within 15 days prior to the removal of potential nesting structures, trees or shrubs, or prior to disturbance of areas in the vicinity of potential nest sites, i.e. trees and shrubs.
2. All active nests will be flagged and a non-disturbance buffer zone established around the nesting tree (or other nesting substrate) in coordination with the CDFG. Buffer zones for passerines and non-passerine land birds typically range between 50 feet to 90 feet depending on the species involved, site conditions, and type of work proposed in the vicinity. Contractor education will be conducted for nesting birds, including a discussion of avoidance and protection measures.
3. Active nests will be monitored by a qualified biologist in coordination with CDFG to determine when the young have fledged and are feeding on their own. The project biologist will be consulted for clearance before construction activities resume in the vicinity. CDFG will be notified if any nest is disturbed.
4. If a new nest site is discovered during construction, the biological monitor would be contacted to implement avoidance procedures, in coordination with CDFG, before construction resumes in the area.

**4.3.5.1.4. Project Impacts on Passerines and Non-Passerine Landbirds**

Special-status passerine and non-passerine landbird species including bank swallow and Allen's hummingbird, have the potential to nest within the BSA. The remaining special-status bird species, as well as other common bird species that may nest on-site could be temporarily disturbed or unable to nest due to construction activity. The hillside which provides potential nesting habitat for bank swallow will be avoided; therefore permanent impacts to this species are not anticipated. Permanent removal of existing structures is not anticipated to have a long term affect on habitat availability as the project will create new structures providing additional habitat for nesting birds such as house finches and swallows.

Under both project alternatives, temporary and permanent project impacts are proposed to potential landbird nesting habitat including central coast riparian scrub, eucalyptus woodland, landscaped/disturbed, mixed broadleaf conifer forest, nonnative scrub/shrubland, northern foredune, and ruderal/disturbed habitat. Under proposed Alternative 4 approximately 1.32 acre of these habitat types will be permanently affected by placement of the ramp structures and approximately 4.17 acres will be temporarily disturbed for construction staging and access. Under proposed Alternative 2b approximately 1.50 acre of these habitats will be permanently affected by placement of the ramp structures and approximately 4.00 acres will be temporarily disturbed for construction staging and access.

**4.3.5.1.5. Compensatory Mitigation for Passerines and Non-Passerine Landbirds**

No compensatory mitigation is proposed for these species.

**4.3.5.1.6. Cumulative Impacts on Passerines and Non-Passerine Landbirds**

In addition to the current project, several other construction projects are being undertaken or are in the planning stages in the immediate vicinity. These projects include the construction of the new SFOBB East Span, and the Treasure Island and YBI Redevelopment Plan. The combined construction efforts may temporarily reduce nesting success of passerine and non-passerine landbirds on the eastern portion of YBI as well as the total natural vegetation available as nesting habitat on the island.

#### **4.3.5.2. SHOREBIRDS, MARSHBIRDS, AND WATERBIRDS**

##### **4.3.5.2.1 Life History for Shorebirds, Marshbirds, and Waterbirds**

Shorebirds and water birds encompass species that are strongly dependent upon aquatic and wetland habitat, and include such families as loons (Gaviidae), grebes (Podicipedidae), pelicans (Pelecanidae), herons and egrets (Ardeidae), swans, geese and ducks (Anatidae), Gruiformes (Gruidae; cranes, Rallidae; rails, coots, moorhens), gulls (Laridae), non-sandpiper shorebirds (Charadriidae, Haematopodidae, Recurvirostridae; plovers, oystercatchers, stilts and avocets), and sandpipers (Scolopacidae). Despite their common association with aquatic habitat, these species have diverse nesting and foraging habits. Many build nests in dense marsh vegetation while others nest in trees as well as open areas with little or low vegetation. Their diets range from vegetation to insects, aquatic invertebrates, fish, amphibians, reptiles, and small mammals.

##### **4.3.5.2.2 Survey Results for Shorebirds, Marshbirds, and Waterbirds**

Suitable nesting and foraging habitat is present on-site for special-status wading birds found in near-shore habitats such as snowy egret (*Egretta thula*), great blue heron (*Ardea herodias*), great egret (*Ardea alba*), and black-crowned night-heron (*Nycticorax nycticorax*). Rookery sites of all of these species are tracked by the CNDDDB. These species are considered to have a moderate potential to occur on-site. A small black-crowned night-heron rookery has been documented on a cliff face on the southern end of YBI, approximately 0.25 mile south of the BSA (Kelly et al. 2006). The eucalyptus woodland and mixed forest within the BSA provides potential roost and nesting habitat for these species. Great blue herons, great egrets, and double-crested cormorants often roost and nest in stands of nonnative trees. In Santa Cruz County, these species have been reported to only nest in eucalyptus groves (Suddjian 2004).

Birds that inhabit salt marsh habitats of the Bay and require dense vegetation for shelter and nesting including black rail (*Laterallus jamaicensis coturniculus*), state-listed threatened and a California Fully Protected species, and California clapper rail (*Rallus longirostris obsoletus*), federally and state-listed endangered, and a California Fully Protected species, are not expected to occur on-site. Although they are known to occur within five miles (Figure 5b), no suitable marsh habitat is present within the boundaries of the BSA for these species.



The California least tern (*Sterna antillarum browni*), federally and state-listed endangered, and a California Fully Protected species, western snowy plover (*Charadrius alexandrinus nivosus*), federally-listed threatened and a California species of special concern, and other sensitive beach nesting birds are not expected to nest on-site due to an absence of suitable habitat. These species nest on protected sand dunes, beaches, or other open but sheltered habitats adjacent to water. Northern foredune habitat on-site is minimal (0.440 acre) and exposed to wave action, making it unsuitable for nest establishment and the remainder of the site is unsuitable due to ongoing construction or dense vegetation; therefore California least tern and western snowy plover are not expected to occur on-site.

Foraging habitat for California least tern is available adjacent to the study area in shallow bay waters and occurrences have been recorded in the region (Figure 5). California least tern foraging habitat is not expected to be impacted by project construction activities given the avoidance of tidal aquatic habitat by project features and construction activities. For both alternatives, the tidal waters of the Bay will be avoided by temporary construction features and permanent project features, and will not be affected by temporary construction activities as standard construction BMP's will be implemented to treat and minimize discharge into the Bay. Implementation of BMP's as described in Section 4.1.1.2 for aquatic habitats will minimize the potential for least tern prey items (fish in the Bay) to be indirectly affected by project construction activities.

The California gull (*Larus californicus*), a CDFG Watch List species, and western gull (*Larus occidentalis*), are both known to nest and forage within San Francisco Bay. A large group of California gulls is known to nest on Alameda Naval Air Station (Goals Project 2000) which is located approximately two miles to the east from the BSA, with nests numbering over 100 in 1997. Western gulls have been reported to nest on the SFOBB structure near the Oakland touchdown (Parsons Brinkerhoff Quade & Douglas 2002). While both of these species nest near the BSA, the close proximity of the on-site portion of the SFOBB structure is unlikely to be attractive as a nesting site for western gulls due to its orientation over land as opposed to being over water. Moreover, California gulls are unlikely to nest within the BSA as there is no undisturbed open habitat that would support a colony. Both species of gulls could forage within the project area as they are opportunistic feeders that will forage in areas with human garbage such as school yards and dumps (Goals Project 2000); therefore, they are considered to have a moderate potential to occur on-site. Additional foraging habitat for California gull and western gull is available adjacent

to the BSA in shallow bay waters. This habitat is not likely to be impacted by project construction activities. Implementation of BMP's as described in Section 4.1.1.2 for aquatic habitats will ensure that gull fish prey in the Bay are not indirectly affected by project construction activities.

**4.3.5.2.3.      *Avoidance and Mitigation Measures for Shorebirds, Marshbirds, and Waterbirds***

Suitable nesting and foraging habitat is present on-site for several species of wading birds, including snowy egret, great blue heron, great egret, and black-crowned night-heron. Therefore, the following measures will be implemented to avoid project related impacts to potentially nesting birds:

1. The removal of any structures, trees or shrubs will occur from September 1 through February 1, outside the breeding season. If removal of trees or shrubs occurs, or construction begins between February 1 and August 31 (the nesting season), a nesting bird survey will be performed by a qualified biologist within 15 days prior to the removal of potential nesting structures, trees or shrubs, or prior to disturbance of areas in the vicinity of potential nest sites, *i.e.* trees and shrubs.
2. All active nests will be flagged and a non-disturbance buffer zone established around the nesting tree in coordination with the CDFG. Buffer zones for wading birds typically range between 100 feet to 200 feet depending on the species involved, site conditions, and type of work proposed in the vicinity. Contractor education will be conducted for nesting birds, including a discussion of avoidance and protection measures.
3. Active nests will be monitored by a qualified biologist to determine when the young have fledged and are feeding on their own. The project biologist will be consulted for clearance before construction activities resume in the vicinity. CDFG will be notified if any nest is disturbed.
4. ESA exclusion fencing will be placed around avoided habitats and contractor education will be conducted to prevent encroachment of construction activities. Bright colored ESA fencing and signage will be implemented and a construction monitor will confirm the fence integrity on a daily basis to protect the area from accidental equipment damage. Fence repair and/or reinforcements will be completed immediately. If a new roost site is

discovered during construction, the biological monitor will be contacted to implement avoidance procedures before construction resumes in the area.

**4.3.5.2.4. Project Impacts on Shorebirds, Marshbirds, and Waterbirds**

Project construction activities have the potential to disturb wading bird species that nest in mature woodlands, such as egrets and herons that attempt nesting within the project area and those that may be nesting adjacent to the site. Under both project alternatives, temporary and permanent project impacts are proposed to eucalyptus woodland and mixed broadleaf conifer forest. Removal of trees will result in a loss of potential nesting habitat. Under proposed Alternative 4 approximately 0.68 acre of woodland and forest habitat will be permanently affected by placement of the ramp structures and approximately 2.48 acres will be temporarily disturbed for construction staging and access. Under proposed Alternative 2b approximately 1.08 acres of woodland and forest habitat will be permanently affected by placement of the ramp structures and approximately 2.08 acres will be temporarily disturbed for construction staging and access.

There will likely be negligible effects on California least tern foraging habitat due to the avoidance of tidal aquatic habitat by project features and construction activities.

**4.3.5.2.5. Compensatory Mitigation for Shorebirds, Marshbirds, and Waterbirds**

Temporarily disturbed woodland and forested areas will be restored, to the extent feasible after completion of construction activities. The SFCTA will offset the removal of eucalyptus woodland and mixed broadleaf conifer forest habitat that may provide nest sites for waterbirds such as herons and egrets by implementing a woodland habitat revegetation plan as described in Section 1.2, as part of its Project Description. Trees removed will be replaced at a minimum 1:1 ratio, with natives to the island replaced at a 3:1 ratio. Compensatory mitigation is not proposed.

**4.3.5.2.6. Cumulative Impacts on Shorebirds, Marshbirds, and Waterbirds**

In addition to the current project, several other construction projects are being undertaken or are in the planning stages in the immediate vicinity. These projects include the construction of the new SFOBB East Span, and the Treasure Island and YBI Redevelopment Plan. The combined construction efforts may temporarily reduce nesting success of wading birds on the eastern portion of YBI as well as the total available woodland habitat on the island.



#### **4.3.5.3 CALIFORNIA BROWN PELICAN**

##### **4.3.5.3.1 *Life History for California Brown Pelican***

The California brown pelican occurs in estuarine, marine, sub-tidal, and marine pelagic waters from the Gulf of California north to Washington and southern British Columbia. They breed exclusively on islands from the Channel Islands off the coast of southern California south to islands off the coast of Baja California. When not breeding, California brown pelicans roost on the open ocean, offshore or mainland rocks, mudflats, sandy beaches, wharfs, and jetties throughout coastal California.

California brown pelicans are plunge divers that fly over water bodies scanning the surface for the shimmer of schooling fish. In California, they feed mainly on sardines (family Clupeidae), mackerels (family Scombridae) and anchovies (family Engraulidae). Pelicans breed in colonies on islands without mammalian predators along the Baja peninsula and in the Gulf of California in Mexico. They build nests of sticks on the ground, usually laying a clutch of three eggs in March or April.

##### **4.3.5.3.2 *Survey Results for California Brown Pelican***

Pelicans are present in the Bay Area as they disperse after breeding in southern California as early as April. By July, thousands of pelicans are seen and remain in the region through September. Pelicans usually retreat to the south by about December (Jaques-Strong 1994).

California brown pelicans utilize Breakwater Island (part of the former Naval Air Station, Alameda) east of the BSA as the “key roost in San Francisco Bay”. They congregate and roost on this disconnected island and use the surrounding waters to forage. At peak density there may be over 8,500 pelicans utilizing Breakwater Island, and hundreds are regularly present (Euing 2007).

Numerous brown pelicans have been observed foraging in the Bay near the BSA (Garcia and Associates 2008), and several pelicans were observed roosting on pilings in the bay immediately adjacent to the site during the site reconnaissance survey. California brown pelicans have been observed immediately adjacent to the BSA and marginally suitable roosting habitat is present on the narrow sandy shoreline rimming the BSA and the small pier which is partially within the BSA, therefore California brown pelicans are considered to have a high potential to roost within or immediately adjacent to the BSA. Brown pelicans are not expected to nest within the BSA, however, as they are only known to nest on Southern California coastal islands.

**4.3.5.3.3.      *Avoidance and Mitigation Measures for California Brown Pelican***

California brown pelicans have a high potential to roost adjacent to the construction envelope. Construction activities immediately adjacent to their roosting habitat could cause disturbance or flushing of individuals. Therefore, the following measures will be implemented to avoid project related impacts to California brown pelican:

Exclusion fencing will be placed around the construction footprint to prevent construction equipment from entering areas where the pelicans may roost. Contractor education will be conducted, including a discussion of avoidance and protection measures. A construction monitor will confirm the fence integrity on a daily basis to protect the area from accidental equipment damage. Fence repair and/or reinforcements will be completed immediately. If a new roost site is discovered during construction, the biological monitor will be contacted to implement avoidance procedures before construction resumes in the area. CDFG will be notified if any new roost site is found, or any roost site is disturbed.

**4.3.5.3.4      *Project Impacts on California Brown Pelican***

California brown pelican has the potential to occur within the BSA and roost on piers and the sandy shoreline just outside the temporary and permanent project construction areas. Temporary disturbance to roosting pelicans could occur if construction activities encroach upon occupied roosting habitat. No permanent impacts to potential roosting areas are anticipated as the project construction footprint will avoid the piers in the Bay and the shoreline including the northern foredune community.

**4.3.5.3.5.      *Compensatory Mitigation for California Brown Pelican***

No compensatory mitigation is proposed due to the lack of permanent impacts.

**4.3.5.3.6.      *Cumulative Impacts on California Brown Pelican***

In addition to the current project, several other construction projects are being undertaken or are in the planning stages in the immediate vicinity. These projects include the construction of the new SFOBB East Span, and the Treasure Island and YBI Redevelopment Plan. If the combined disturbance is great enough, pelicans may abandon roost sites around YBI and Treasure Island.

#### **4.3.5.4 DOUBLE-CRESTED CORMORANT**

##### **4.3.5.4.1 Life History for Double-Crested Cormorant**

The double-crested cormorant is a common resident in waterways and water bodies throughout California. They may forage for fish at almost any significant water source, from ponds and streams to the open ocean. They nest on steep slopes, cliff faces, tall trees, and tall human-made structures such as transmission towers beside water (CDFG 2005).

##### **4.3.5.4.2 Survey Results for Double-Crested Cormorant**

During the site reconnaissance survey, double-crested cormorants were observed foraging in the Bay. Furthermore, double crested cormorants are known to nest on bridges, including the Richmond-San Rafael Bridge (Wunderlich per. obs.) and the SFOBB (Woodward-Clyde 1998, USDT - FHWA 2001) and have been observed on YBI (Garcia and Associates 2008) (Figure 5b). On the Richmond-San Rafael Bridge, cormorants general nest below the roadway on the supporting steel structure, and will roost nearby on the SFOBB structure as well as on any exposed rocks in the bay. Based on the presence of suitable roosting habitat such as exposed pilings, piers and rocks immediately adjacent to the eastern edge of the BSA, and their known presence in the vicinity, double-crested cormorant are considered to have a high potential to roost within the BSA and a low potential to nest within the SFOBB structure on-site.

##### **4.3.5.4.3 Avoidance and Mitigation Measures for Double-Crested Cormorant**

Double-crested cormorants have potential to nest and forage on-site. Construction activities on or adjacent to the existing SFOBB structure or the eastern border of the BSA could potentially disturb cormorants. Therefore, the following measures are recommended to avoid project related impacts to double-crested cormorants:

1. Throughout project construction, monitoring of the potential cormorant nest sites on the existing SFOBB will be continued following the methodology outlined in the Final Revised Bird Monitoring and Management Plan (LSA 2003).
2. If construction activities begins between February 1 and August 31 (the nesting season), a nesting bird survey of the on-site SFOBB structure will be performed by a qualified biologist within 15 days prior to onset of



construction to ensure that no cormorants have begun to nest in the structure or within 200 feet of the project disturbance footprint.

3. All active nests will be flagged or mapped and a non-disturbance buffer zone established around the nest in coordination with the. Buffer zones for typically range between 100 feet to 200 feet for wading and waterbirds depending on the species involved, site conditions, and type of work proposed.
4. Active nests will be monitored by a qualified biologist to determine when the young have fledged and are feeding on their own. The CDFG will be consulted for clearance before construction activities resume. CDFG will be notified if any nest is disturbed.
5. Exclusion fencing will be placed around the construction footprint to prevent construction equipment for entering areas where the cormorants may roost. A construction monitor will confirm the fence integrity on a daily basis to protect the area from accidental equipment damage. Fence repair and/or reinforcements will be completed immediately.
6. If a new roost or nest site is discovered during construction, the biological monitor will be contacted to implement avoidance procedures before construction resumes in the area.

#### **4.3.5.4.4. *Project Impacts on Double-Crested Cormorant***

Double-crested cormorants have the potential to occur within the BSA. Construction activities on or adjacent to the existing SFOBB structure could potentially disturb nesting cormorants, and cause nest failure or abandonment. Construction activities along the eastern border of the BSA could potentially temporarily disturb roosting cormorants, if construction activities move outside of the construction envelope. The project will have no permanent impact to cormorant roosting, nesting or foraging habitat.

#### **4.3.5.4.5. *Compensatory Mitigation for Double-Crested Cormorant***

No compensatory mitigation is proposed for this species.

#### **4.3.5.4.6. *Cumulative Impacts on Double-Crested Cormorant***

In addition to the current project, several other construction projects are being undertaken or are in the planning stages in the immediate vicinity. These projects include the construction of the new SFOBB East Span, and the Treasure Island and

YBI Redevelopment Plan. If the combined disturbance is great enough, cormorants may abandon nest and roost sites around the SFOBB, YBI, and Treasure Island.

#### 4.3.6 Discussion of Special-Status Terrestrial Mammals

A total of 16 special-status terrestrial mammal species were considered during the preparation of this report because of the presence of occurrences nearby, or because the BSA falls within or in the vicinity of the historical range of these species, including:

- Pallid bat (*Antrozous pallidus*), a California Species of Special Concern
- Berkeley kangaroo rat (*Dipodomys heermanni berkeleyensis*), a species tracked by the CNDDDB
- Silver-haired bat (*Lasionycteris noctivagans*), a species tracked by the CNDDDB
- Western red bat (*Lasiurus blossevillii*), a California Species of Special Concern
- Hoary bat (*Lasiurus cinereus*), a species tracked by the CNDDDB
- San Pablo vole (*Microtus californicus sanpabloensis*), a species tracked by the CNDDDB
- Long-eared myotis bat (*Myotis evotis*), a species tracked by the CNDDDB
- Fringed myotis bat (*Myotis thysanodes*), a species tracked by the CNDDDB
- Long-legged myotis bat (*Myotis volans*), a species tracked by the CNDDDB
- San Francisco dusky-footed woodrat (*Neotoma fuscipes annectens*), a California Species of Special Concern
- Salt marsh harvest mouse (*Reithrodontomys raviventris*), federally and state-listed endangered and a California Fully Protected Species
- Angel Island mole (*Scapanus latimanus insularis*), a California Species of Special Concern
- Alameda Island mole (*Scapanus latimanus parvus*), a California Species of Special Concern
- Salt marsh wandering shrew (*Sorex vagrans halicoetes*), a California Species of Special Concern

- American badger (*Taxidea taxus*), a California Species of Special Concern
- Point Reyes jumping mouse (*Zapus trinotatus orarius*), a California Species of Special Concern

Based on the absence of suitable salt marsh habitat and isolation from known occurrences (Figure 5b), salt marsh harvest mouse and salt marsh wandering shrew are not expected to occur within the BSA. YBI is isolated from known occurrences and populations of San Pablo vole, Point Reyes jumping mouse, Angel Island mole, Alameda island mole, American badger, and Berkeley kangaroo rat by the waters of the Bay (CDFG 2008a) (Figure 5b), and therefore these species are not expected to occur (see Appendix A). Special-status terrestrial mammal species that have potential to occur on-site are discussed in more detail below.

#### **4.3.6.1 SPECIAL-STATUS BATS**

##### **4.3.6.1.1 Life History of Special-Status Bats**

There are 24 known species of bats in California. Of those, 11 are classified as California Species of Special Concern (CDFG 2008c). Five special-status bat species have a moderate potential to occur within the BSA, including western red bat, hoary bat, long-eared myotis bat, fringed myotis bat, and long-legged myotis bat.

These species variously use mature trees, snags, crevices, and human-made structures (such as buildings) for roosting, either for winter roosting (hibernacula) or for forming nursery colonies. Bats are generally site faithful and will not abandon an established roosting area unless disturbed.

##### **4.3.6.1.2 Survey Results for Special-Status Bats**

Several species of bats have a potential to use structures and trees on-site for roosting. Structures such as the existing SFOBB roadway structure, between the YBI landing and YBI tunnel, have crevices and nooks that provide potential refuge for bats as temporary night roosts. Additionally there are several uninhabited buildings within the BSA that could provide adequate day and night roosting habitat in gaps beneath roof tiles or exterior trim, or within the structures themselves, and several potential access points for bats to enter and leave these structures were identified. The study site also contains stands of mature trees, which could provide roosting habitat within the canopy, cavities in the trees, or beneath loose bark. Foraging habitat is available throughout the BSA, wherever insects may congregate, such as near nighttime light sources. An acoustical bat survey was conducted as part of the biological resources



analysis for the Treasure Island/Yerba Buena Island Redevelopment Project by ESA in 2009. Calls recorded overnight on two occasions indicated that Mexican free-tailed bats (*Tadarida brasiliensis*) are the predominant species present on the island (City of San Francisco 2010). However, the survey was not exhaustive and other species that may be considered special-status were not ruled out.

#### **4.3.6.1.3. Avoidance and Minimization Efforts for Special-Status Bats**

A pre-construction survey for roosting bats will be performed by a qualified biologist within 30 days prior to any removal of trees or structures on the site. If no active roosts are found, then no further action would be proposed. If either a maternity roost or hibernacula (structures used by bats for hibernation) is present, the following minimization measures will be implemented:

- If active maternity roosts or hibernacula are found in trees or structures which will be removed or disturbed as part of project construction, the roost will be avoided by construction activities to the extent feasible. If an active maternity roost is located and avoidance of the occupied tree or structure is not feasible, demolition can commence before maternity colonies form (i.e., prior to March 1) or after young are volant (flying) (i.e., after July 31). Disturbance-free buffer zones as determined by a qualified biologist in coordination with CDFG will be observed during the maternity roost season (March 1 - July 31). CDFG will be notified if any maternity roost or hibernacula is disturbed.
- ESA exclusion fencing will be placed around avoided habitats and contractor education will be conducted to prevent encroachment of construction activities. Bright colored ESA fencing and signage will be implemented and a construction monitor will confirm the fence integrity on a daily basis to protect the area from accidental equipment damage. Fence repair and/or reinforcements will be completed immediately. If a new roost site is discovered during construction, the biological monitor will be contacted to implement avoidance procedures before construction resumes in the area.
- If a non-breeding bat hibernacula is found in a tree or structure scheduled for removal, the individuals will be safely evicted, under the direction of a qualified biologist (as determined by possession of a Memorandum of Understanding (MOU) with CDFG typically amended to the individual's scientific collecting permit), by opening the roosting area to allow airflow through the cavity. Demolition can then follow at least one night after initial

disturbance for airflow. This action should allow bats to leave during darkness, thus increasing their chance of finding new roosts with a minimum of potential predation during daylight. Trees or structures with roosts that need to be removed will first be disturbed at dusk, just prior to removal that same evening, to allow bats to escape during the darker hours.

#### **4.3.6.1.4.      *Project Impacts on Special-Status Bats***

Project construction activities have the potential to directly affect bats roosting within the project area and indirectly disturb those that may be roosting adjacent to the site. Under both project alternatives, temporary and permanent project impacts are proposed to eucalyptus woodland and mixed broadleaf conifer forest that provide potential roost sites. Removal of trees will result in a loss of potential bat roosting habitat. Under proposed Alternative 4 approximately 0.68 acre of woodland and forest habitat will be permanently affected by placement of the ramp structures and approximately 2.48 acres will be temporarily disturbed for construction staging and access. Under proposed Alternative 2b approximately 1.08 acre of woodland and forest habitat will be permanently affected by placement of the ramp structures and approximately 2.08 acres will be temporarily disturbed for construction staging and access. In addition the SFOBB structure and portions of the road way will be disturbed and modified during construction. This may result in a loss of potential roost sites. No buildings are proposed for removal under Alternative 4; however, implementation of Alternative 2b would require removal of one unoccupied building that provides potential roost habitat.

#### **4.3.6.1.5.      *Compensatory Mitigation for Special-Status Bats***

If special-status bats are found roosting within trees or structures on-site that require removal or if occupied habitat is accidentally damaged during construction, the SFCTA will create appropriate replacement roosts at a suitable location on-site or off site in coordination with a qualified biologist, Caltrans, and/or CDFG.

#### **4.3.6.1.6.      *Cumulative Impacts on Special-Status Bats***

In addition to the current project, several other construction projects are being undertaken or are in the planning stages in the immediate vicinity. These projects include the construction of the new SFOBB East Span, and the Treasure Island and YBI Redevelopment Plan. If bat roosts are present, particularly a maternity roost site, the combined construction efforts may result in the loss of local bat populations.

#### 4.3.6.2 DUSKY FOOTED WOODRAT

##### 4.3.6.2.1. Life History of Dusky Footed Woodrat

The San Francisco dusky-footed wood rat is a medium-sized rat which builds large stick nests at the bases of trees and shrubs. These nests average 46 inches high, and contain multiple chambers and openings (Carraway 1991). They prefer forested habitat with a moderate to complete canopy cover and brushy understory, and are often found on the upper banks of riparian forests. However, wood rats will also nest in chaparral, coastal sage-scrub and mixed coniferous forests (Carraway 1991). Nesting locations are determined based on a combination of dark, cool surroundings, low to moderate humidity and dense cover (Linsdale 1957). San Francisco dusky-footed wood rats feed on a variety of woody plants, fungi, flowers and seeds (Jameson and Peeters 2004), but prefer evergreen vegetation high in fiber, tannins and polyphenolics such as oaks, California bay, alders, willows, coffeeberry, toyon, coyote brush, and Douglas fir, among others (Atsatt and Ingram 1983, Carraway 1991). Home ranges average ½ acre with males having slightly larger home ranges, all of which overlap from 15 to 62 percent depending on breeding activity (Carraway 1991).

Wood rats are commonly preyed on by weasels, coyotes, bobcats, and rattlesnakes as well as several raptors such as barn owls, great horned owls, and red-tailed hawks (Carraway 1991). Most notably, wood rats are the preferred prey of the Northern spotted owl. Wood rats and their nests provide food and cover for a wide range of species including parasitic mouse (*Peromyscus californicus*), deer mouse, harvest mouse (*Reithrodontomys megalotis*), ornate shrew (*Sorex ornatus*), brush rabbit, western fence lizard, garter snake (*Thamnophis* spp.), California whipsnake (*Masticophis lateralis*), gopher snake (*Pituophis melanoleucus*), ensatina (*Ensatina eschscholtzii*), California slender salamander (*Batrachoseps attenuatus*), and California newt (*Taricha torosa*), among others (Carraway 1991).

##### 4.3.6.2.2. Survey Results for Dusky Footed Woodrat

Thick understory beneath the eucalyptus and mixed broadleaf woodland canopies composed of ivy, as well as small acacia and other shrubby plants, provide potential habitat for San Francisco dusky-footed woodrat. Although no San Francisco dusky-footed woodrat houses were observed during the site visit, these structures can be quite cryptic, the site provides ample material for the building of these structures, and San Francisco dusky-footed woodrats have been known to build houses in stands of eucalyptus, such as those found on-site. They have also been observed using



eucalyptus leaves as food and nest making material (Hodge 2008). Therefore, San Francisco dusky-footed woodrat are considered to have a moderate potential to occur on-site.

#### ***4.3.6.2.3. Avoidance and Minimization Efforts for Dusky Footed Woodrat***

A pre-construction survey for San Francisco dusky-footed woodrat and associated woodrat houses will be performed by a qualified biologist within 30 days prior to any removal of trees or other vegetation on the site and within 100 feet of planned construction activities. If no active houses are found, then no further action would be proposed. If active woodrat houses are found in or below trees and vegetation which will be removed or temporarily disturbed as part of project construction, the project will be redesigned to avoid the loss of the occupied habitat and disturbance to woodrats to the extent feasible. If the project cannot be redesigned to avoid removal of the occupied habitat, the woodrat house may be relocated to a suitable location as close to the original house as possible while maintaining an adequate buffer of construction activities in coordination with CDFG. Animal exclusion fencing will be placed around construction area, to prevent woodrat ingress, and contractor education will be conducted. A construction monitor will confirm the fence integrity on a daily basis to protect the area from accidental equipment damage. Fence repair and/or reinforcements will be completed immediately. If a new nest site is discovered during construction, the biological monitor will be contacted to implement avoidance procedures before construction resumes in the area, in coordination with CDFG. CDFG will be notified if any nest is disturbed.

#### ***4.3.6.2.4. Project Impacts on Dusky Footed Woodrat***

Project construction activities have the potential to directly affect woodrats if they occur within the project area and indirectly disturb those that may be utilizing woodlands and/or forests adjacent to the site. Under both project alternatives, temporary and permanent project impacts are proposed to eucalyptus woodland and mixed broadleaf conifer forest that provide potential habitat. Removal of vegetation will result in a loss of potential foraging and nesting habitat. Under proposed Alternative 4 approximately 0.68 acre of woodland and forest habitat will be permanently affected by placement of the ramp structures and approximately 2.48 acres will be temporarily disturbed for construction staging and access. Under proposed Alternative 2b approximately 1.08 acre of woodland and forest habitat will be permanently affected by placement of the ramp structures and approximately 2.08 acres will be temporarily disturbed for construction staging and access.

#### **4.3.6.2.5. Compensatory Mitigation for Dusky Footed Woodrat**

If San Francisco dusky-footed woodrat houses are found within portions of the project site that require permanent or temporary disturbance or if occupied habitat is accidentally damaged during construction, the SFCTA will create appropriate replacement houses/nests at a suitable location on-site or off site in coordination with a qualified biologist, Caltrans, and/or CDFG. Follow-up monitoring efforts will be conducted to evaluate relocation success and additional mitigation may be necessary if relocated houses are not successful.

#### **4.3.6.2.6. Cumulative Impacts on Dusky Footed Woodrat**

In addition to the current project, several other construction projects are being undertaken or are in the planning stages in the immediate vicinity. These projects include the construction of the new SFOBB East Span, and the Treasure Island and YBI Redevelopment Plan. If present, the combined construction efforts may temporarily reduce the number of woodrats on the eastern portion of YBI as well as the total available woodland habitat on the island.

### **4.3.7 Discussion of Special-Status Marine Mammals**

Potential project impacts to nine federally listed marine mammal species under the jurisdiction of NMFS were considered because the study area falls within or in the vicinity of the historical range of these species or the species have been identified as occurring near the study area, including:

- Guadalupe fur seal (*Arctocephalus townsendi*)
- Sei whale (*Balaenoptera borealis*)
- Blue whale (*Balaenoptera musculus*)
- Finback whale (*Balaenoptera physalus*)
- Southern sea otter (*Enhydra lutris nereis*)
- Right whale (*Eubalaena glacialis*)
- Stellar sea lion (*Eumetopias jubatus*)
- Humpback whale (*Megaptera novaeangliae*)
- Sperm whale (*Physeter catadon*)

Several species of federally listed marine mammals occur off of the Central California Coast. However, only the humpback whale has been known to enter the

San Francisco Bay on occasion and it is not expected to occur in the vicinity of the project area. If a humpback whale were to move into waters of the Bay, implementation of construction BMPs for adjacent aquatic habitats as described in Section 4.1.1.2 would minimize the potential for indirect effects. Given that it is extremely unlikely for them to be present in San Francisco Bay, the project will have no affect on federally listed marine mammals.

Impacts to four marine mammal species which are not listed under the FESA, but which do receive protection under the MMPA were also evaluated. These species were considered because the study area falls within or in the vicinity of the historical range of these species or the species have been identified as occurring near the study area, including:

- Harbor seal (*Phoca vitulina*)
- Harbor porpoise (*Phocoena phocoena*)
- California sea lion (*Zalophus californicus*)
- Gray whale (*Eschrichtius robustus*)

Harbor seal, California sea lion, harbor porpoise, and gray whale, all have potential to occur in the vicinity of the study area. Although the study area is located immediately adjacent to the San Francisco Bay, no work would be conducted within the limits of the San Francisco Bay, and the only aquatic habitat present within the study area is limited to concrete-lined drainage swales adjacent to roadsides, which do not provide habitat for marine mammal species. Gray whales and harbor porpoises are entirely aquatic, ocean species, and the likelihood of them occurring in waters adjacent to the site is extremely low. There will be no direct project effects on these species. If gray whale and/or harbor porpoise were to occur in waters of the Bay on occasion, the potential for indirect effects would be minimized with the implementation of BMPs designed to protect adjacent aquatic habitats during construction.

Because of their presence in the Bay and potential to use surrounding shoreline habitats, harbor seals and California sea lions are discussed in more detail below.

#### **4.3.7.1 HARBOR SEAL**

##### **4.3.7.1.1 Life History of Harbor Seal**

Harbor seals are permanent residents in the San Francisco and San Pablo Bays. Harbor seals forage aquatically but use land to haul-out and pup. They feed on a



variety of fish including surf perch (*Embiotocidae* fishes) and plainfin midshipman (*Porichthys notatus*), with variation in the dominant fish taken both seasonally and based upon the portion of the bay in which they reside. Harbor seals are generally solitary, or in mother-pup pairs when in the water, although they will haul-out in groups ranging in size from a few individuals to several hundred (Riedman 1990). Harbor seals breed in the spring and early summer, giving birth 11 months later, to a single pup. Pups are weaned in four weeks.

Harbor seals haul out at 12 main sites in the SF Bay (Parsons Brinkerhoff 2002) with several smaller sites used as well, and had 8 known pupping sites in the early 1990's (Goals Project 2000). Haul-outs sites generally require several features to be suitable for harbor seals, such as sloping terrain, deep water immediately adjacent, and no disturbance from boats or land access. Seals are extremely sensitive to human disturbance, are extremely wary of their surroundings, and have been known to abandon haul out sites when disturbance increases and/or food resources decrease, as evidenced by the abandonment of Strawberry Spit near Marin (Grigg 2000). Many of the sites traditionally used are islands or completely surrounded by water, such as Brooks Island, and Castro Rocks, and there has been some limited use of a floating abandoned dock by Sausalito. Pupping sites are generally the most protected from disturbance, and harbor seals are slow to colonize new pupping sites. Harbor seals have been known to pup at Castro Rocks, Newark Slough and Mowry Slough (Goals Project 2000).

#### **4.3.7.1.2. Survey Results for Harbor Seal**

Harbor seals are known to haul-out on the southeast side of YBI 1,600 feet from the BSA (Parsons Brinkerhoff 2002, SRS 2004, Goals Project 2000) (Figure 5b). The haul out site on YBI is a small rocky beach in a cove just west of the lighthouse, surrounded by steep hillsides, making access by land difficult, and thereby minimizing disturbance. In 1999, the haul-out site at YBI had 72 seals and three pups reported (Goals Project 2000), although this site is not confirmed as an active pupping site, as no births have been observed at the site. While the YBI haul-out site is an active, and well used site, its relative isolation from disturbance distinguishes it from the rest of the island, and in particular the BSA.

The BSA does not immediately meet the water's edge, and does not include beach areas easily accessed by seals for haul out purposes, with the exception of the southeastern edge which is adjacent to a small area of sandy beach. This beach area is subject to a large amount of water-based human disturbance from the nearby USCG

facility as well as ongoing construction disturbance from the land, which would likely preclude harbor seals from hauling out at this location. Furthermore, there are no records of harbor seals using this area for hauling out. Based on the absence of suitable haul-out habitat, harbor seals are not expected to occur on-site (see Appendix A). However, harbor seals may forage in the Bay immediately offshore from the project area.

**4.3.7.1.3.      *Avoidance and Minimization Efforts for Harbor Seal***

The project design is such that harbor seal habitat and individuals will be avoided by construction activities. Based on the hydroacoustic analysis (Illingworth & Rodkin, Inc. 2011), no avoidance and minimization or mitigation measures are proposed.

**4.3.7.1.4.      *Project Impacts on Harbor Seal***

Project construction activities that involve loud equipment such as pile driving have the potential to injure or disturb behavior patterns of harbor seals utilizing waters of the San Francisco Bay adjacent to the site. The project will employ pile driving techniques under both alternatives. However, none of these activities will occur within aquatic habitats. All construction activities, including pile driving of piers for installation of the ramps, will occur on land in soils that are not saturated. H-piles (steel piles) will be driven into the ground; the other type of piles to be used are concrete piles which are to be placed, not driven (a hole is augered and the concrete is placed inside). The closest H-piles will be driven approximately 300 feet from the shoreline under Alternative 2B and 90 feet from the shoreline under Alternative 4. The primary source of underwater noise would be ground borne vibration released into the bay. Illingworth & Rodkin, Inc. prepared a hydro-acoustic analysis for pile driving activities under both project alternatives (Illingworth & Rodkin, Inc. 2011a). Predictions for distances to accepted NMFS thresholds were made using actual measurements taken by Illingworth & Rodkin, Inc. from similar pile driving experiences. Injury and behavioral disturbance thresholds accepted by NMFS are described by root-mean-square pressure (RMS) for marine mammals as follows:



**Table 5. Marine Mammal Disturbance Thresholds for Marine Construction Activities**

Species	Airborne Noise Threshold (dB re: 20µPa)	Underwater Noise threshold (dB re: 1µPa)		
	In Air Sound Pressure Levels (RMS)	Vibratory Pile Driving Disturbance Threshold	Impact Pile Driving Disturbance Threshold	Injury Threshold
Harbor Seals	90 dB RMS <sup>1</sup> (un-weighted)	120 dB RMS	160 dB RMS	190 dB RMS
Sea Lions and Sea Otters	100 dB RMS <sup>1</sup> (un-weighted)	120 dB RMS	160 dB RMS	190 dB RMS
Cetaceans	NA	120 dB RMS	160 dB RMS	180 dB RMS

Source: (70 FR 1871), Southal et al. 2007: 71FR 3260 January 20, 2006; and  
WADOT.wa.gov/nr/rdonlyres/216F21DA./BA\_Marine/Noisethreshold.pdf

The data used in Illingworth & Rodkin, Inc.'s analysis is based primarily on data measured for installation of a temporary crane platform on YBI in November 2008. Therefore soil types and transmission loss through the soils would be similar to the project area, providing a reasonable comparison. For the crane platform, piles were driven approximately 40 feet from the water's edge producing maximum underwater sound levels of 157 dB RMS at underwater measurement locations of 131 feet. This was the closest location that measurements could be made due to the shallowness of the water. The closest pile for Alternative 4 is located 90 feet from the shoreline. Given that this pile will be farther away from marine mammal foraging habitat than those installed for the crane platform, underwater noise levels are expected to be even lower for construction of the YBI Ramps under both alternatives. Thus, project construction noise levels are not expected to reach the minimum established injury threshold of 190 dB RMS nor the minimum established disturbance threshold of 160 dB RMS for harbor seals (Illingworth & Rodkin, Inc. 2011a).

Although there is an active haul-out, and potential pupping site on YBI, this haul-out site is located over 1,600 feet from the study area and is characteristically distinct from the study area. The haul out site is not within line of site of the study area and is protected from the study area by the surrounding hillsides. Illingworth & Rodkin, Inc (2011b) calculated the distance to the airborne noise disturbance limit for harbor seals (90 dB RMS) to be 700 feet for  $L_{max}/RMS$  (maximum sound level) and 250 feet for  $L_{eq}/RMS$  during pile driving activities. Given the distance of the haul out site, the airborne noise threshold of 90 dB RMS will not be reached at that location during pile driving activities. Sound levels of air-borne construction noise may approach these



levels at the water's surface adjacent to the site however any foraging harbor seals could avoid disruption by swimming under water where sound levels are not expected to reach disturbance thresholds as described above.

Based on the absence of suitable haul-out habitat on site, distance and topographic position of the known haul out site on YBI, the absence of construction activity within the San Francisco Bay, and the above hydroacoustic analysis no effects to harbor seals are expected from either project alternative.

#### **4.3.7.1.5.      *Compensatory Mitigation for Harbor Seal***

The project will not result in loss of any harbor seal habitat. Compensatory mitigation is not proposed.

#### **4.3.7.1.6.      *Cumulative Impacts on Harbor Seal***

It is unlikely that the project would have an adverse cumulative effect on the seals as there are no components of the project that are in or immediately adjacent to the water and haul out areas are not present on site. The known haul out site on YBI is far enough away that construction noise will have no cumulative impact on pupping or resting seals.

### **4.3.7.2            CALIFORNIA SEA LION**

#### **4.3.7.2.1. *Life History of California Sea Lion***

California sea lions occur along the entire California coast, and occur year-round in the Bay. California sea lions breed from San Luis Obispo County south to the Gulf of California, Baja California, Mexico, although they have been known to breed further north on rare occasions. Pups are born between May and June. California sea lions feed primarily on schooling fish species such as anchovies, midshipman and Pacific herring (Goals Project 2000). In the San Francisco Bay populations of California sea lion peak during the winter herring run from December to February. California sea lions are only known to haul out in three places in the Bay, Pier 39 in San Francisco (Parsons Brinkerhoff 2002, Goals Project 2000), Angel Island, and Seal Rock, which is located just beyond the Golden Gate Bridge.

#### **4.3.7.2.2. *Survey Results for California Sea Lion***

While California sea lions could potentially forage near the BSA, it is unlikely that any individuals would haul-out near the BSA. Based on the absence of suitable haul-out habitat and the absence of work within the bay, California sea lions are not

expected to occur on-site (see Appendix A), or be adversely affected by the construction activities.

**4.3.7.2.3. Avoidance and Minimization Efforts for California Sea Lion**

The project design is such that sea lion habitat and individuals will be avoided by construction activities. Based on the hydroacoustic analysis (Illingworth & Rodkin, Inc. 2011), no avoidance and minimization or mitigation measures are proposed.

**4.3.7.2.4. Project Impacts on California Sea Lion**

Project construction activities that involve loud equipment such as pile driving have the potential to injure or disturb behavior patterns of sea lions utilizing waters of the San Francisco Bay adjacent to the site. The project will employ pile driving techniques under both alternatives. However, none of these activities will occur within aquatic habitats. All construction activities, including pile driving of piers for installation of the ramps, will occur on land in soils that are not saturated. H-piles (steel piles) will be driven into the ground; the other type of piles to be used are concrete piles which are to be placed, not driven (a hole is augered and the concrete is placed inside). The closest H-piles will be driven approximately 300 feet from the shoreline under Alternative 2B and 90 feet from the shoreline under Alternative 4. The primary source of underwater noise would be ground borne vibration released into the bay. Illingworth & Rodkin, Inc. prepared a hydro-acoustic analysis for pile driving activities under both project alternatives (Illingworth & Rodkin, Inc. 2011a). Predictions for distances to accepted NMFS thresholds were made using actual measurements taken by Illingworth & Rodkin, Inc. from similar pile driving experiences. Injury and behavioral disturbance thresholds accepted by NMFS are described by root-mean-square pressure (RMS) for marine mammals as follows:

**Table 6. Marine Mammal Disturbance Thresholds for Marine Construction Activities**

	Airborne Noise Threshold (dB re: 20µPa)	Underwater Noise threshold (dB re: 1µPa)		
Species	In Air Sound Pressure Levels (RMS)	Vibratory Pile Driving Disturbance Threshold	Impact Pile Driving Disturbance Threshold	Injury Threshold
Harbor Seals	90 dB RMS <sup>1</sup> (un-weighted)	120 dB RMS	160 dB RMS	190 dB RMS
Sea Lions and Sea Otters	100 dB RMS <sup>1</sup> (un-weighted)	120 dB RMS	160 dB RMS	190 dB RMS
Cetaceans	NA	120 dB RMS	160 dB RMS	180 dB RMS

Source: (70 FR 1871), Southal et al. 2007: 71FR 3260 January 20, 2006; and  
WADOT.wa.gov/nr/rdonlyres/216F21DA./BA\_Marine/Noisethreshold.pdf

The data used in Illingworth & Rodkin, Inc.'s analysis is based primarily on data measured for installation of a temporary crane platform on YBI in November 2008. Therefore soil types and transmission loss through the soils would be similar to the project area, providing a reasonable comparison. For the crane platform, piles were driven approximately 40 feet from the water's edge producing maximum underwater sound levels of 157 dB RMS at underwater measurement locations of 131 feet. This was the closest location that measurements could be made due to the shallowness of the water. The closest pile for Alternative 4 is located 90 feet from the shoreline. Given that this pile will be farther away from marine mammal foraging habitat than those installed for the crane platform, underwater noise levels are expected to be even lower for construction of the YBI Ramps under both alternatives. Thus, project construction noise levels are not expected to reach the minimum established injury threshold of 190 dB RMS nor the minimum established disturbance threshold of 160 dB RMS for sea lions (Illingworth & Rodkin, Inc. 2011a).

Illingworth & Rodkin, Inc (2011b) calculated the distance to the airborne noise disturbance limit for seal lions (100 dB RMS) to be 230 feet for  $L_{max}/RMS$  (maximum sound level) and 80 feet for  $L_{eq}/RMS$  during pile driving activities. Sound levels of air-borne construction noise may approach the airborne noise threshold of 100 dB RMS at the water's surface immediately adjacent to the site for Alternative 4 where pile driving will occur within 90 feet of the shoreline; however, any foraging sea lions could avoid disruption by swimming under water where sound levels are not expected to reach disturbance thresholds.



Based on the absence of suitable haul-out habitat on site, the absence of construction activity within the San Francisco Bay, and the above hydroacoustic analysis no affects to sea lions are expected from either project alternative.

**4.3.7.2.5. Compensatory Mitigation for California Sea Lion**

The project will not result in loss of any harbor seal habitat. Compensatory mitigation is not proposed.

**4.3.7.2.6. Cumulative Impacts on California Sea Lion**

It is unlikely that the project would have an adverse cumulative effect on the seals as there are no components of the project that are in or immediately adjacent to the water and haul out areas are not present on site. Known haul out sites in the region are far enough away that construction noise will have no cumulative impact on resting sea lions.

## **Chapter 5. Results: Permits and Technical Studies for Special Laws or Conditions**

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### **5.1. FESA (Federal Endangered Species Act) Consultation Summary**

Based on an absence of suitable habitat and isolation from known populations in the region, terrestrial species listed under the FESA are not expected to occur on-site. Fish species falling under the purview of the USFWS or NOAA-Fisheries are not expected to occur in waters adjacent to the site. Therefore, it has been determined that the project will have no effect on federally listed species regulated by the USFWS or NOAA-Fisheries.

### **5.2. Federal Fisheries and EFH (Essential Fish Habitat) Consultation Summary**

Based on the Alternative 2B project design which avoids sensitive aquatic habitats, restricts pile driving to a minimum of 300 feet from the shoreline and implements BMPs, this alternative will have no effect on fisheries or marine mammals. Alternative 4 will also implement BMPs and avoid direct impacts to aquatic habitats however it will involve pile driving within 90 feet of the shoreline. It is also anticipated that this alternative will have no effect on fisheries or marine mammal behavior patterns in the area based on the hydroacoustical analysis.

### **5.3. CESA (California Endangered Species Act) Consultation Summary**

Proposed avoidance and minimization measures will reduce potential project impacts to species listed under the CESA that occur in the vicinity of the project area or have potential to occur on-site including the bank swallow. Bank swallows have not been documented on YBI however, the project has been designed to avoid impacts to potential habitat within the BSA and a pre-construction survey will be conducted for nesting birds prior to construction to avoid take of any individuals. Thus a 2081 permit from CDFG will not be necessary.

#### **5.4. Wetlands and Other Waters Coordination Summary**

Concurrent with the site reconnaissance, EDAW biologists Kristin Asmus and Hildie Spautz conducted a wetland delineation and preliminary jurisdictional determination of the project site in accordance with the procedures outlined in the USACE Wetlands Delineation Manual (Environmental Laboratory 1987) and Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Arid West Region (USACE 2008). The entire BSA was surveyed on foot and all distinct plant communities were visited and described. Locations of potential wetlands and waters of the United States and State were recorded and mapped on a 1"=50' aerial map of the project area.

A request for verification of their jurisdiction is being submitted to the USACE. USACE conducted a preliminary review of photos and the jurisdictional determination map and indicated via e-mail correspondence on January 4<sup>th</sup>, 2011, that several of the unvegetated waters features appear to have been constructed in uplands, drain only uplands, and are therefore not jurisdictional. However, USACE stated that the remaining features may fall under their jurisdiction as natural ephemeral drainages. These jurisdictional features will be avoided by permanent and temporary construction activities under both alternatives. Only .01 acre (586 square feet) of non-jurisdictional features will be disturbed by temporary construction activities. Therefore notifications or permits are not anticipated (e.g., 404 CWA permit from USACE and 401 Certification from RWQCB). The unvegetated non-jurisdictional features will be restored at a 1:1 ratio on-site post construction, therefore compensatory mitigation is not anticipated.

Regardless of the jurisdictional outcome over the drainages on-site, the project will be reviewed with the RWQCB to ensure adequate water quality protection during and post construction. A SWPPP will be developed and standard construction BMP's implemented to meet RWQCB standards. The SWPPP will be submitted for approval to the RWQCB.

#### **5.5. County Tree Ordinance Coordination Summary**

A tree removal permit is not necessary for the project as it is exempt from the City ordinances which apply to significant trees via sovereign immunity based upon the federal ownership of YBI (Malamut 2009).



## Chapter 6. References

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# Appendix A Regionally Occurring Special-Status Animal Species

Scientific Name	Common Name	Federal Status	State Status	Habitat	Potential for Occurrence
<b>Invertebrates</b>					
<i>Banksula incredula</i>	Incredible harvestman	None	CNDDDB	Only known species in the genus not found in caves. Known in only one locality in the San Francisco area, on the north slope of San Bruno Mountain ridge, just south of San Francisco. Found on talus slope consisting of Franciscan sandstone with a dense chaparral canopy.	Not Expected No habitat in study area
<i>Branchinecta lynchi</i>	Vernal pool fairy shrimp	FT	None	Inhabits vernal pools in grasslands in the Central Valley, Coast Ranges and South Coast mountains, specifically the Slanted Rocks Area, west of Byron Hot Springs, in Contra Costa County. Occur in small depressions in sandstone outcrops surrounded by foothill grasslands. Other common habitat is a swale, earth slump, or basal-flow depression basin with a grassy or muddy bottom, found in unplowed grasslands. Occurrences are noted in the Central Valley, Coast Ranges, and South Coast mountains. Active between December and May.	Not Expected No habitat in BSA
<i>Caecidotea tomalensis</i>	Tomaes isopod	None	CNDDDB	Found in still or slow-moving vegetated water such as streams and ponds. Found from Sonoma to San Mateo counties.	Not Expected No habitat in BSA
<i>Calicina diminua</i>	Marin blind harvestman	None	CNDDDB	Found under rocks in serpentine grassland. Known only from Marin county.	Not Expected No habitat in BSA
<i>Callophrys (=Incisalia) mossii bayensis</i>	San Bruno elfin butterfly	FE	None	Coastal, mountainous areas with grassy ground cover, mainly in the vicinity of San Bruno Mountain, San Mateo County. The adult flight period is late February to mid-April, with the peak flight period occurring in March and early April. Eggs are laid in small clusters or strings on the upper or lower surface of stonecrop ( <i>Sedum spathulifolium</i> ).	Not Expected No habitat in BSA
<i>Cicindela hirticollis gravida</i>	Sandy beach tiger beetle	None	CNDDDB	Found in moist sand near the ocean, for example in swales behind dunes or upper benches beyond normal high tides. Metapopulations known from San Diego through Marin Counties.	Very Low Marginally suitable habitat present in BSA
<i>Danaus plexippus</i>	Monarch butterfly	None	CNDDDB	Roosts located in wind-protected tree groves (eucalyptus, Monterey pine, cypress), with nectar and water sources nearby. Winter roost sites extend along the coast from northern Mendocino to Baja California, Mexico.	Moderate Suitable habitat present in BSA
<i>Dermocerus californicus dimorphus</i>	Valley elderberry longhorn beetle	FT	None	Typically inhabits oak savanna and riparian forests in the Central Valley below 3,000 feet elevation. Requires elderberry ( <i>Sambucus</i> spp.) as host plant for all stages of its life cycle.	Not Expected Outside of range
<i>Dufourea stageri</i>	Stage's dufourine bee	None	CNDDDB	Found from San Bruno Mountain south to the Santa Cruz Mountains.	Not Expected Outside of range

Scientific Name	Common Name	Federal Status	State Status	Habitat	Potential for Occurrence
<i>Euphydryas editha bayensis</i>	Bay checkerspot butterfly	FT	None	Restricted to Santa Clara and San Mateo Counties in California. Habitat exists on shallow, serpentine-derived or similar soils, which support the butterfly's larval food plant, California plantain ( <i>Plantago erecta</i> ) and nectar plants including desert-parsely ( <i>Lomatium</i> spp.) and California goldfields ( <i>Lasthenia californica</i> ), among others.	Not Expected No habitat in BSA
<i>Haliotis cracherodii</i>	Black abalone	FC	None	High intertidal zone to 6 m depth, most abundant intertidally, Coos Bay (Oregon) to Cabo San Lucas (Baja California)	Not Expected No habitat in BSA
<i>Haliotis sorenseni</i>	White abalone	FE	None	Found in open low and high relief rock or boulder habitat that is interspersed with sand channels from Point Conception, California, USA, to Punta Abreojos, Baja California, Mexico.	Not Expected Outside of range
<i>Helminthophyta nickliniana bridgesii</i>	Bridges' Coast Range shoulderband snail	None	CNDDB	Known from Contra Costa and Alameda Counties from Berkeley and San Pablo to the eastern base of Mount Diablo. Typically found in moist, often riparian areas under rocks, logs, woody debris, or accumulations of leaf mould.	Not Expected Outside of range
<i>Hydroporus leechi</i>	Leech's skyline diving beetle	None	CNDDB	San Mateo County, California. May be endemic to San Francisco peninsula. Found in freshwater ponds, shallow water of streams, marshes, and lakes.	Not Expected No habitat in BSA
<i>Incisalia mossii bayensis</i>	San Bruno elfin butterfly	FE	None	Found on rocky outcrops, woody canyons, cliffs, limited to the San Bruno Mountains in San Mateo County, California and a few nearby sites.	Not Expected No habitat in BSA
<i>Ischnura gemina</i>	San Francisco forktail damselfly	None	CNDDB	Frequent streams and ponds, does not stray far from water. Known only from isolated spots within the San Francisco Bay Area.	Not Expected No habitat in BSA
<i>Lichnanthe ursina</i>	Pacific sand bear (=Bumblebee scarab beetle)	None	CNDDB	Inhabits coastal sand dunes from Sonoma County south to San Mateo County.	Not Expected No habitat in study area
<i>Microcina leei</i>	Lee's microblind harvestman	None	CNDDB	Found beneath sandstone rocks in open oak grassland. Only known from two occurrences in the Oakland-Berkeley Hills, near the UC Berkeley campus.	Not Expected Outside of range
<i>Microcina tiburona</i>	Tiburon microblind harvestman	None	CNDDB	Known from Marin County. Closely associated with serpentine grasslands and outcroppings and found primarily underneath medium to large, undisturbed rocks in contact with the soil. It is believed that this type of habitat provides the ideal humidity and thermal conditions.	Not Expected Outside of range
<i>Nothochrysa californica</i>	San Francisco lacewing	None	CNDDB	Coastal sage scrub to riparian and oak woodlands.	Very Low Marginally suitable habitat present in BSA
<i>Plebejus (=Icaricia) icarioides missionensis</i>	Mission blue butterfly	FE	None	Majority of colonies known to occur in San Mateo county. Also known to occur at the Mission District of San Francisco and Fort Baker, Marin County. Habitat consists of coastal chaparral and coastal grasslands supporting the Mission blue butterfly's larval food plants, silverbush lupine ( <i>Lupinus albus</i> ), summer lupine ( <i>L. formosus</i> ), and varted lupine ( <i>L. varicolor</i> ).	Not Expected No habitat in BSA
<i>Speyeria callippe callippe</i>	Callippe silverspot butterfly	FE	None	Inhabits grasslands containing larval host plant johnny-jump-up ( <i>Viola pedunculata</i> ). Known from three locations, including San Bruno Mountain (on the San Francisco Peninsula), Joaquin Miller Park in Alameda County, and in the vicinity of American Canyon, Solano County.	Not Expected No habitat in BSA
<i>Speyeria zerene myrtilae</i>	Myrtle's silverspot butterfly	FE	None	Found in coastal dune or prairie habitat in western Marin and southwestern Sonoma counties, including the Point Reyes National Seashore. Adult butterflies are typically found in areas that are sheltered from the wind, below 820 feet elevation, and within 3 miles of the coast. Females are single-brooded and lay their eggs in the debris and dried stems of violets (typically <i>Viola adunca</i> ), the larval food plants.	Not Expected No habitat in BSA



Scientific Name	Common Name	Federal Status	State Status	Habitat	Potential for Occurrence
<i>Trachusa gumifera</i>	A leaf-cutter bee ( <i>Gumifera</i> leaf-cutter bee)	None	CNDDB	Found in San Francisco, Marin, and San Mateo Counties.	Very Low Marginally suitable habitat present in BSA
<i>Tryonia imitator</i>	Mimic tryonia (California brackishwater snail)	None	CNDDB	Inhabits coastal lagoons, estuaries, and salt marshes. Found only in permanently submerged areas in a variety of sediment types, and is able to withstand a wide range of salinities. Known from the	Not Expected No habitat in BSA
<i>Vespericola marinensis</i>	Marin hesperian	None	CNDDB	Found throughout the Point Reyes Peninsula and surrounding region.	Not Expected Outside of range
<b>Fish*</b>					
<i>Acipenser medirostris</i>	Green sturgeon (Southern DPS)	FT	CSC	Anadromous. Inhabits the coastal Pacific Ocean and estuaries of large rivers. Migrates far inland to spawn. Spawns during spring in rivers in deep, cold, fast-moving water. Estuaries serve as nurseries. Adults are mostly marine, spending limited time in estuaries and rivers. The Southern DPS is listed as <b>Threatened</b> .	Not Expected BSA does not include suitable aquatic habitat
<i>Archoplites interruptus</i>	Sacramento perch	None	CSC	Historically found in the sloughs, slow-moving rivers, and lakes of the Central Valley. Prefers warm water. Aquatic vegetation is essential for young. Tolerant of wide ranges of physio-chemical water conditions.	Not Expected BSA does not include suitable aquatic habitat
<i>Eucyclogobius newberryi</i>	Tidewater goby	FE	CSC	Occurs in tidal streams associated with coastal wetlands. Typically occurs in loose aggregations of a few to several hundred individuals on the substrate of shallow water less than three feet deep. Occurs along the entire California coast.	Not Expected BSA does not include suitable aquatic habitat
<i>Hypomesus transpacificus</i>	Delta smelt	FT	ST	Historically found throughout the lower and middle reaches of the Sacramento - San Joaquin Delta. Spawning takes place between December - April in side channels and sloughs in the middle reaches of the Delta.	Not Expected BSA does not include suitable aquatic habitat
<i>Oncorhynchus kisutch</i>	Coho salmon (Central California Coast ESU)	FE	SE	Critical habitat is designated to include all river reaches accessible to listed coho salmon from Punta Gorda south to the San Lorenzo River, including Mill Valley and Corte Madera Creeks, tributaries to San Francisco Bay. Also known from stream surveys in Aptos Creek.	Not Expected BSA does not include suitable aquatic habitat
<i>Oncorhynchus mykiss irideus</i>	Steelhead (Central California Coast ESU)	FT	None	The ESU includes all naturally spawned populations of steelhead (and their progeny) in California streams from the Russian River to Aptos Creek, and the drainages of San Francisco and San Pablo Bays eastward to the Napa River (inclusive), excluding the Sacramento-San Joaquin River Basin.	Not Expected BSA does not include suitable aquatic habitat
<i>Oncorhynchus mykiss irideus</i>	Steelhead (Central Valley, California ESU)	FT	None	The ESU includes all naturally spawned populations of steelhead (and their progeny) in the Sacramento and San Joaquin Rivers and their tributaries. Excluded are steelhead from San Francisco and San Pablo Bays and their tributaries. Little historical data exists for the San Joaquin River Basin. McEwan and Jackson (1996) reported a small remnant run in the Stanislaus River. Steelhead reported in Tuolumne River in 1983 and in Merced River. May have historically been in many of the San Joaquin River tributaries, especially during wet years.	Not Expected BSA does not include suitable aquatic habitat
<i>Oncorhynchus tshawytscha</i>	Chinook salmon (Central Valley spring-run ESU)	FT	ST	The ESU includes all naturally spawned populations of spring-run chinook salmon in the Sacramento River and its tributaries in California. These salmon are anadromous, inhabiting open ocean and coastal streams. Adults move upstream March-July and begin spawning in August.	Not Expected BSA does not include suitable aquatic habitat



Scientific Name	Common Name	Federal Status	State Status	Habitat	Potential for Occurrence
<i>Oncorhynchus tshawytscha</i>	Chinook salmon (winter-run)	FE	SE	This salmon is anadromous, inhabiting open ocean and coastal streams. Adults move upstream January-June and begin spawning in April. Downstream migrant smolts move past Red Bluff August-October.	Not Expected BSA does not include suitable aquatic habitat
<b>Amphibians</b>					
<i>Ambystoma californiense</i>	California tiger salamander (Central Valley)	FT	CSC	Breeds in temporary or semi-permanent pools. Seeks cover in rodent burrows in grasslands and oak woodlands. This DPS inhabits the Coast Ranges north of Santa Barbara County and south of Sonoma County, as well as the Central Valley from Tulare to Colusa County.	Not Expected No habitat in BSA
<i>Rana (=aurora draytonii) draytonii</i>	California red-legged frog	FT	CSC	Prefers semi-permanent and permanent stream pools, ponds, and creeks with emergent and/or riparian vegetation. Will occupy upland areas during the wet winter months.	Not Expected No habitat in BSA
<i>Rana boylei</i>	Foothill yellow-legged frog	None	CSC	Inhabits permanent, slow-moving stream courses in the Coast Ranges and Sierra Nevada foothills. These streams usually contain a cobble substrate and a mixture of open canopy riparian vegetation.	Not Expected No habitat in BSA
<b>Reptiles</b>					
<i>Actinemys (=Clemmys) marmorata</i>	Western pond turtle	None	CSC	Prefers permanent, slow-moving creeks, streams, ponds, rivers, marshes, and irrigation ditches with basking sites and a vegetated shoreline. Needs upland sites for egg laying. Occurs from the Oregon border to the San Francisco Bay, inland throughout the Sacramento Valley, and south along the coastal zone to San Diego County.	Not Expected No habitat in BSA
<i>Caretta caretta</i>	loggerhead turtle	FT	None	Ranges throughout temperate oceans worldwide, though in our area rarely found north of Southern California.	Not Expected Outside of range
<i>Chelonia mydas</i>	green turtle	FT	None	Ranges worldwide in warmer seas. Rarely found north of Baja California in our area.	Not Expected Outside of range
<i>Dermochelys coriacea</i>	leatherback turtle	FE	None	Ranges worldwide in temperate to cool seas.	Not Expected Outside of range
<i>Lepidochelys olivacea</i>	olive ridley sea turtle	FT	None	Ranges in warmer parts of oceans worldwide, nests in more tropical areas.	Not Expected Outside of range
<i>Masticophis lateralis euryxanthus</i>	Alameda whipsnake (striped racer)	FT	ST	Restricted to chaparral and coastal scrub of the Alameda and Contra Costa Counties. Uses rock outcrops for refugia. Inhabits appropriate habitat on south, southwest- and southeast-facing slopes and ravines where the shrubs form a vegetative mosaic with grasses. Uses rodent burrows. Feeds on a number of items including fence lizards ( <i>Sceloporus</i> spp.).	Not Expected Outside of range
<i>Thamnophis sirtalis tetrataenia</i>	San Francisco garter snake	FE	SE/CFP	Largest population occurs in San Mateo County. Smaller populations occur along the coast from Sharp Park to Año Nuevo and east through the Santa Cruz Mountains. Use freshwater marshes, ponds and slow-moving streams and surrounding upland areas.	Not Expected Outside of range
<b>Birds</b>					
<i>Accipiter cooperii</i>	Cooper's hawk (nesting site only)	None	WL	Nests primarily in deciduous riparian forests. May also occupy dense canopied forests from gray pine-oak woodland to ponderosa pine. Forages in open woodlands. Occurs throughout the San Francisco Bay Area.	Moderate Suitable habitat present in BSA
<i>Aquila chrysaetos</i>	Golden eagle (nesting/wintering sites only)	None	CFP/WL	Forages in a variety of habitats including grasslands, chaparral, and oak woodland supporting abundant mammals. Nests on cliffs and escarpments, and tall trees. Occurs throughout the San Francisco Bay Area.	Very Low Marginally suitable habitat present in BSA
<i>Ardea alba</i>	Great egret	None	CNDDB	Nests in colonies with other species, in shrubs and trees over water, and on islands. Feeds in variety of wetlands, including marshes, swamps, streams, rivers, ponds, lakes, tide flats, canals, and flooded fields.	Moderate Suitable habitat present in study area
<i>Ardea herodias</i>	Great blue heron	None	CNDDB	Colonial nester in tall trees, cliffsides, and sequestered spots on marshes. Common over most of North America.	Moderate Suitable habitat present in study

Scientific Name	Common Name	Federal Status	State Status	Habitat	Potential for Occurrence
<i>Athene cunicularia hypugea</i>	Burrowing owl (burrow sites)	None	CSC	Open, dry grasslands, deserts, prairies, farmland and scrublands with abundant active and abandoned mammal burrows. Occurs in lowlands throughout California.	Not Expected No suitable open habitat in BSA
<i>Brachyramphus marmorata</i>	Marbled murrelet	FT	SE	Occurs year-round in marine subtidal and pelagic habitats from the Oregon border to Point Sal, Santa Barbara County. Breeding individuals in California largely concentrated on coastal waters off Del Norte and Humboldt Counties, and in lesser numbers off San Mateo and Santa Cruz Counties. In the nonbreeding season, recorded as far south as Imperial Beach, San Diego County. Partial to coastlines with stands of mature redwood and Douglas-fir; uses these trees for nesting and probably roosting. Also noted in such habitats in winter.	Not Expected Outside of range
<i>Branta hutchinsii leucopareia</i>	Cackling (=Aleutian Canada) goose	FD	CNDDDB	Nests in the Aleutian islands, winters in the Central Valley south to Merced.	Not Expected Outside of range
<i>Charadrius alexandrinus nivosus</i>	Western snowy plover (nesting)	FT	CSC	Breed primarily on coastal beaches from southern Washington to Baja California. Sand spits, dune-backed beaches, unvegetated beach strands, open areas around estuaries, and beaches at river mouths are preferred nesting habitat.	Not Expected No nesting habitat in BSA. Northern foredune habitat is minimal (0.44 acre) and exposed to wave action. Rest of site is unsuitable due to ongoing construction or dense vegetation.
<i>Circus cyaneus</i>	Northern harrier (nesting)	None	CSC	Nests and forages in grasslands and agricultural fields. Nests on ground in shrubby vegetation, dense grass, or crops such as wheat and barley, often at the edge of marshes. Occurs throughout the San Francisco Bay Area.	Not Expected No suitable open habitats in BSA
<i>Egretta thula</i>	snowy egret	None	CNDDDB	Colonial nester, with nest sites situated in protected beds of dense tules. Feeds in variety of wetlands, including marshes, swamps, streams, rivers, ponds, lakes, tide flats, canals, and flooded fields.	Moderate Suitable habitat present in BSA
<i>Elanus leucurus</i>	White-tailed kite (nesting sites)	None	CFP	Inhabits agricultural areas, low rolling foothills, valley margins with scattered oaks and river bottomlands, or marshes adjacent to deciduous woodlands. Prefers open grasslands, meadows, marshes, and agricultural fields for foraging. Occurs throughout the San Francisco Bay Area.	Moderate Suitable habitat present in BSA
<i>Falco peregrinus anatum</i>	American peregrine falcon (nesting)	None	CFP	Nests and roosts on protected ledges of high cliffs and bridges, usually adjacent to lakes, rivers, or marshes. Permanent resident in the North and South Coast Ranges. Winters in the Central Valley southward through the Transverse and Peninsular Ranges. Feeds almost exclusively on birds. Known to breed on SFOBB.	High Nests on both spans of SFOBB
<i>Geothlypis trichas sinuosa</i>	Salt marsh common yellowthroat	None	CSC	Known throughout the Bay Area from Napa to Santa Cruz Counties. Nests in freshwater marshes in the spring and summer and moves into tidal sloughs and channels during the winter. Requires contiguous freshwater and salt water marsh habitats.	Not Expected No suitable marsh habitat in BSA
<i>Haliaeetus leucoccephalus</i>	Bald eagle	FD	CFP/SE	Typically forage over large bodies of water, or large free-flowing rivers. Fish are their primary prey item, but they will also feed on waterfowl. Nests are built in tall trees near water bodies that support fish and waterfowl populations.	Not Expected No suitable habitat in BSA

Scientific Name	Common Name	Federal Status	State Status	Habitat	Potential for Occurrence
<i>Hydroprogne caspia</i>	Caspian tern	None	CNDDB	Nests on sandy or gravelly beaches and shell banks in small colonies inland and along the coast. Known from Solano, Contra Costa, and Imperial Counties.	Not Expected No nesting habitat in BSA.
<i>Larus californicus</i>	California gull (nesting colony)	None	WL	Nests at inland water bodies east of the Sierra Nevada Mountains such as Mono Lake. Small nesting colonies present in San Francisco Bay.	Moderate Suitable habitat present in BSA
<i>Larus occidentalis</i>	western gull	None	None	Common along Pacific Coast, extremely rare more than a few miles inland. Known to nest on western span of SFOBB.	Moderate Suitable habitat present in BSA
<i>Laterallus jamaicensis</i> • <i>colurniculus</i>	California black rail	None	ST/CFP	Secretive marsh bird found in tidal and non-tidal wetlands with dense vegetation. Nests near the ground, typically in dense pickleweed or low grass. Highly vulnerable to predation during high tide events. Year-round resident in the greater Bay Area and recently recorded in smaller populations in isolated freshwater marshes in the Sierra foothills.	Not Expected No suitable marsh habitat in BSA
<i>Melospiza melodia maxillaris</i>	Suisun song sparrow	None	CSC	Inhabits marshes of the Suisun Bay area from Martinez eastward along the south bayshore of Suisun Bay to Pittsburg, then north of Suisun Bay throughout the extensive Suisun marshlands. The only remaining wetlands supporting these birds in the Carquinez Strait apparently is at the north end of Southampton Bay (Benicia Marsh).	Not Expected No suitable marsh habitat in BSA
<i>Melospiza melodia pusillula</i>	Alameda (South Bay) song sparrow	None	CSC	Occurs only along the southern and eastern fringes of the San Francisco Bay. Inhabits salt marsh habitats with dense vegetation, and upland habitats for refugia. Known from suitable salt marsh habitats on YBI.	Moderate No suitable marsh habitat for nesting in BSA. May forage on-site.
<i>Melospiza melodia samuelis</i>	San Pablo song sparrow	None	CSC	Distributed in marshes around San Pablo Bay continuously from Gallinas Creek in the west, along the northern San Pablo bayshore, and throughout the extensive marshes along the Petaluma, Sonoma and Napa Rivers. All along the southeast shoreline of San Pablo Bay, isolated populations occur in small marshes between Wilson Point and Pinole Point, and at the mouths of	Not Expected Outside of range
<i>Nycticorax nycticorax</i>	Black-crowned night heron (rookery)	None	CNDDB	Found in lowlands and foothills throughout most of California. Nests in trees with dense foliage and in wetlands with dense emergent vegetation.	Moderate Suitable habitat present in BSA
<i>Pandion haliaetus</i>	Osprey (nesting)	None	WL	Nests in snags or on man-made structures such as telephone poles near fish-producing water bodies. Forages mainly on fish. Nests along the North Coast Range, Cascades, and Sierra Nevada's, and winters along the coast of central and southern California.	Very Low Foraging habitat in Bay adjacent to site
<i>Pelecanus occidentalis californicus</i>	California brown pelican (nesting colony)	FE	CFP	Found in estuarine, marine subtidal, and marine pelagic waters along the California coast. Rare occurrence inland at the Salton Sea. Breeds on Channel Islands: Anacapa, Santa Barbara, and Santa Cruz. Usually rests on water or inaccessible rocks (either offshore or on mainland), but also uses mudflats, sandy beaches, wharfs, and jetties. Winters in the San Francisco Bay Area	High Wintering and roosting only, not expected to nest in BSA
<i>Phalacrocorax auritus</i>	Double-crested cormorant	None	WL	Breeds colonially on coastal cliffs, offshore islands, bridges, and lake margins in the interior of the state. Known from sites throughout the San Francisco Bay Area and Sacramento River Delta. Forages in lakes, rivers, and bays.	High Nests on SFOBB



Scientific Name	Common Name	Federal Status	State Status	Habitat	Potential for Occurrence	
					Not Expected	Outside of range
<i>Phoebastria (=Diomedea) albatrus</i>	Short-tailed albatross	FE	None	Pelagic; often in regions of high productivity. Ranges from Alaska to Southern California. Nests on the ground on small oceanic islands; on volcanic ash slopes with sparse vegetation, formerly on level open areas adjacent to tall clumps of the grass. Nesting sites restricted to outlying islands of Japan in the western Pacific.		
<i>Rallus longirostris obsoletus</i>	California clapper rail	FE	SE/CFP	Inhabits tidal salt marshes of the greater San Francisco Bay, although some individuals use brackish marshes during the spring breeding season. It formerly occurred at Humboldt Bay in Humboldt County, Elkhorn Slough in Monterey County, and Morro Bay in San Luis Obispo County. Requires well developed marshes with dense vegetation for nesting and access to tidal sloughs or exposed mud for foraging.	Not Expected	No suitable marsh habitat in BSA
<i>Riparia riparia</i>	Bank swallow	None	ST	Nests in colonies on sandy cliffs near water, marshes, lakes, streams, and the ocean. Forages in fields. Largest remaining populations occur along the Sacramento River from Tehama County to Sacramento County. Also found along the Feather and lower American Rivers, and in the Owens Valley. Breeding populations also present in San Francisco County, and at Año Nuevo in southern San Mateo County.	Low	Suitable habitat present on hillside within BSA
<i>Rynchops niger</i>	Black skimmer	None	CSC	Neotropical migrant, ranges from South America to southern California coasts. Strays occasionally to San Francisco Bay Area, and has been sighted in Alameda County. Nests on gravel bars, low islets, and sandy beaches, in unvegetated sites. Nesting colonies usually less than 200 pairs.	Not Expected	No nesting habitat in BSA. Northern foredune habitat is minimal (0.44 acre) and exposed to wave action. Rest of site is unsuitable due to ongoing construction or dense vegetation.
<i>Selasphorus sasin</i>	Allen's hummingbird	None	CNDDB	Breeds throughout coastal California south to Santa Barbara. Chaparral, thickets, brushy hillsides, open coniferous woodlands, and gardens near the coast, often in ravines and canyons. Nests on twigs or forks of trees or shrubs, sometimes on stalks of plants, among vines, or occasionally in buildings.	Moderate	Potential habitat within scrub and wooded areas on-site.
<i>Sternula antillarum browni</i>	California least tern	FE	SE/CFP	Nests on sand dunes close to water. Mixes freely with other terns. Nesting sites range from San Francisco Bay to Baja California. Nests on the Oakland Army Base and Alameda Naval Air Station.	Not Expected	No nesting habitat in BSA. Northern foredune habitat is minimal (0.44 acre) and exposed to wave action. Rest of site is unsuitable due to ongoing construction or dense vegetation.

Scientific Name	Common Name	Federal Status	State Status	Habitat	Potential for Occurrence
<i>Xanthocephalus xanthocephalus</i>	Yellow-headed blackbird	None	CSC	Nests in freshwater emergent wetlands with dense vegetation & deep water. Often along borders of lakes or ponds. Its range extends as far west as central-interior British Columbia, moving directly south through the central-interior west coast to northeastern Baja California.	Not Expected No suitable marsh habitat in BSA
<b>Mammals</b>					
<i>Antrozous pallidus</i>	Pallid bat	None	CSC	Large range in western North America; fairly common in many areas; however, regional population trends are poorly known. Inhabits open, dry habitats such as deserts, grasslands, and shrublands with rocky areas for roosting. Roosts in caves, mine tunnels, crevices in rocks,	Not Expected No suitable habitat in BSA
<i>Dipodomys heermanni berkeleyensis</i>	Berkeley kangaroo rat	None	CNDDDB	Known from open grassy hilltops and open spaces in chaparral and blue oak/digger pine woodlands in Alameda and Contra Costa Counties. Needs fine, deep, well drained soil for burrowing.	Not Expected Outside of range
<i>Lasionycteris noctivagans</i>	Silver-haired bat	None	CNDDDB	Primarily a coastal & montane forest dweller feeding over streams, ponds & open brushy areas. Range from Alaska across southern Canada south through all the US states except Florida.	Not Expected No suitable habitat in BSA
<i>Lasiurus blossevillii</i>	Western red bat	None	CSC	From Shasta County south to the Mexico, west of the Sierra Nevada/Cascade crest and deserts. The winter range includes western lowlands and coastal regions south of San Francisco Bay. Roosting habitat includes forests and woodlands from sea level up through mixed conifer forests.	Very Low Suitable habitat present in study area
<i>Lasiurus cinereus</i>	Hoary bat	None	CNDDDB	Found throughout California. Habitats suitable for bearing young include all woodlands and forests with medium to large-size trees and dense foliage.	Moderate Suitable habitat present in study area
<i>Microtus californicus sanpabloensis</i>	San Pablo vole	None	CSC	Saltmarshes of San Pablo Creek, on the south shore of San Pablo Bay. Previous sightings include the Point Pinole Regional Park, along Wildcat Creek, Giant Saltmarsh.	Not Expected Outside of range
<i>Myotis evotis</i>	Long-eared myotis bat	None	CNDDDB	Inhabits thinly forested areas around buildings or trees. Occasionally found in caves. Does not occur in large colonies. Distributed throughout the western U.S.	Moderate Suitable habitat present in BSA
<i>Myotis thysanodes</i>	Fringed myotis bat	None	CNDDDB	Roosts in colonies in caves and attics of old buildings. Distributed throughout the western U.S. and into Mexico. Most frequent in coastal and montane forests and around mountain meadows.	Moderate Suitable habitat present in BSA
<i>Myotis volans</i>	Long-legged myotis bat	None	CNDDDB	Roosts colonially in buildings, small pockets and crevices in rock ledges, and exfoliating tree bark and hollows within snags. Distributed throughout the western U.S., Mexico, and Canada.	Moderate Suitable habitat present in study
<i>Neotoma fuscipes annectens</i>	San Francisco dusky-footed woodrat	None	CSC	Evergreen or live oaks and other dense, thick-leaved trees and shrubs are important habitat components for this species. In riparian areas, highest densities of woodrats and their houses are often encountered in willow thickets with an oak overstory. Typically build large houses on the ground in thickets made of twigs, leaves, and debris.	Moderate Suitable habitat present in BSA
<i>Reithrodontomys raviventris</i>	Salt marsh harvest mouse	FE	SE/CFP	Restricted to saline emergent wetlands of San Francisco Bay and its tributaries. Habitat consists primarily of pickleweed. Does not burrow; builds loose nests. Requires high ground to escape high tides and floods.	Not Expected No suitable salt marsh habitat in BSA
<i>Scapanus latimanus insularis</i>	Angel Island mole	None	CNDDDB	Only known from Angel Island.	Not Expected Outside of range
<i>Scapanus latimanus parvus</i>	Alameda Island mole	None	CSC	Only known from Alameda Island. Found in a variety of habitats, especially annual and perennial grasslands. Prefers moist, friable soils. Avoids flooded soils.	Not Expected Outside of range



<i>Sorex vagrans halicoetes</i>	Salt marsh wandering shrew	None	CSC	Occur in the tidal salt marshes of the south San Francisco Bay.	Not Expected	No suitable salt marsh habitat in BSA
<b>Scientific Name</b>	<b>Common Name</b>	<b>Federal Status</b>	<b>State Status</b>	<b>Habitat</b>	<b>Potential for Occurrence</b>	
<i>Taxidea taxus</i>	American badger	None	CSC	Inhabits open grasslands, savannas, and mountain meadows near timberline. Requires abundant burrowing mammals, their principal food source, and loose, friable soils. Distributed throughout California except in the humid forests of the extreme northwest.	Not Expected	No suitable grassland habitat in BSA
<i>Zapus trinotatus orarius</i>	Point Reyes jumping mouse	None	CSC	Found in bunch grass marshes on the uplands of Point Reyes.	Not Expected	No suitable grassland habitat in BSA
<b>Marine Mammals</b>						
<i>Arctocephalus townsendi</i>	Guadalupe fur seal	FT	CFP/ST	Occurs on island shores with solid rock and large lava blocks, usually at the base of tall cliffs. Remains in vicinity of breeding area throughout the year, though wandering individuals are sighted regularly off the California coast.	Not Expected	No suitable aquatic habitat in BSA
<i>Balaenoptera borealis</i>	Sei whale	FE	None	Worldwide, but distribution and movements during much of year are poorly known. Coast of Mexico to Gulf of Alaska in the eastern North Pacific. Generally in deep water; along edge of continental shelf and in open ocean. Migrates between lower-latitude wintering grounds and higher-latitude feeding grounds. Movements in specific areas may be unpredictable.	Not Expected	No suitable aquatic habitat in BSA
<i>Balaenoptera musculus</i>	Blue whale	FE	None	Mainly pelagic; generally prefers cold waters and open seas, but young are born in warmer waters of lower latitudes. There may be a basically resident or short distance migratory population off California and Baja California. Generally seen off California coasts from early summer through autumn.	Not Expected	No suitable aquatic habitat in BSA
<i>Balaenoptera physalus</i>	Finback (=fin) whale	FE	None	Pelagic; usually found in largest numbers 25 miles or more from shore. Travels singly, in pairs, or in pods of 6-7. May concentrate in areas of abundant food. Seen off California coasts in summer and autumn.	Not Expected	No suitable aquatic habitat in BSA
<i>Enhydra lutris nereis</i>	Southern sea otter	FT	CFP	Coastal waters within 2 km of shore, especially shallows with kelp beds and abundant shellfish. In rough weather, takes refuge among kelp, or in coves and inlets. Rarely comes ashore. Range along the central California coast, south of Half Moon Bay to Point Conception.	Not Expected	No suitable aquatic habitat in BSA
<i>Eschrichtius robustus</i>	Gray whale	MMPA	None	Eastern Pacific population seen off California coasts in summer and autumn during migration. Breeds during December - March in Baja coastal lagoons, then migrates north to summer feeding grounds in the Bering and Chukchi seas. Occasionally enters the San Francisco Bay during migration. Is a baleen whale, feeding primarily on benthic invertebrates.	Not Expected	No suitable aquatic habitat in BSA
<i>Eubalaena glacialis</i>	Right whale	FE	None	Inhabits nearshore and offshore waters. North Pacific animals concentrated in relatively warm, shallow (50 to 80 m deep), well-stratified water. Travels singly or in small groups of 2-3, though may aggregate in areas with high concentration of food.	Not Expected	No suitable aquatic habitat in BSA
<i>Eumetopias jubatus</i>	Steller (=northern) sea lion	FT	None	Known to breed on the Farallon Islands. Female sea lions tend to select locations for pupping that are gently sloping and protected from waves. The beaches can be sand, gravel, cobble, boulder, or bedrock. Marine habitats include coastal waters near shore and over the continental slope; sometimes rivers are ascended in pursuit of prey. When not on land, the sea lions may congregate at nearshore traditional rafting sites, or move out to the edge of the continental shelf. While offshore, the sea lions are most often found within 35 km of shore, but may range out to several hundred kilometers offshore. The distance sea lions move offshore varies seasonally, with fewer animals being sighted at sea during the summer.	Not Expected	No suitable aquatic habitat in BSA
<i>Megopteria novaeangliae</i>	Humpback whale	FE	None	Worldwide distribution. Feeds on krill and small fish. Humpbacks swim in pods of up to a dozen at calving grounds, and in smaller groups of three to four during migration. Found along California coast in summer and fall. Occasionally humpbacks have been noted in the San Francisco Bay.	Not Expected	No habitat in BSA



<i>Phoca vitulina</i>	Harbor seal	MMPA	None	Occur north of the equator in both the Atlantic and Pacific Oceans. In the Pacific they range from Alaska to Baja California, Mexico. Found in groups of as many as 500 individuals. Are known to haul out and pup in the San Francisco/San Pablo Bays.	Very Low	Known haul-out located on YBI. No suitable haul-out habitat on study site
<i>Phocoena phocoena</i>	Harbor porpoise	MMPA		Occur in Northern Pacific and Atlantic in shallow coastal waters. Range south to Vancouver/Seattle.	Not Expected	Outside of range
<b>Scientific Name</b>	<b>Common Name</b>	<b>Federal Status</b>	<b>State Status</b>	<b>Habitat</b>	<b>Potential for Occurrence</b>	
<i>Physeter catodon</i>	Sperm whale	FE	None	Worldwide distribution. Feeds on deep-water squid, octopus and fish. Found generally off-shore in deep water.	Not Expected	No suitable aquatic habitat in BSA
<i>Zatophus californicus</i>	California sea lion	MMPA	None	California sea lions are found from Vancouver Island, British Columbia to Baja California, Mexico. They breed mainly on offshore islands, ranging from southern California's Channel Islands south to Mexico, although a few pups have been born on Año Nuevo and the Farallon Islands in central California. They are found within the San Francisco Bay, and are known to haul out at Seal Rock and Pier 39 in San Francisco.	Very Low	No suitable haul-out habitat within the BSA
* Fish not expected to be affected due to all construction occurring on land						

## Appendix B Regionally Occurring Special-Status Plants

Family Scientific Name Common Name	Status <sup>1</sup>	Habitat Affinities and Reported Localities in the Project Area	Comments	Potential for Occurrence On Site
<b>Apiaceae - Parsley Family</b>				
<i>Lilaeopsis masonii</i> Mason's lilaeopsis	Federal: None State: CR CNPS IB.1	Intertidal brackish and freshwater marshes along streambanks. Recorded in the San Joaquin and Sacramento River Delta and lower Napa River channel.	April-November perennial herb	Not expected: no suitable habitat present.
<i>Sanicula maritima</i> adobe sanicle	Federal: None State: CR CNPS IB.1	Chaparral, coastal prairie, coastal meadows and valley/foothill grassland on clay or ultramafic soils. Restricted to San Luis Obispo and Monterey counties; presumed extirpated in Alameda and San Francisco counties.	April-May perennial herb	Not expected: no suitable habitat present.
<b>Asteraceae - Sunflower Family</b>				
<i>Balsamorhiza macrolepis</i> var. <i>macrolepis</i> big-salak balsamroot	Federal: None State: CEQA CNPS IB.2	Cismontane woodland, valley/foothill grassland, sometimes on serpentine. Occurs from the Bay Area to the northern Sacramento Valley and Sierra foothills.	March-June perennial herb	Not expected: no suitable habitat present.
<i>Blapharizonia plumosa</i> big tarplant	Federal: None State: CEQA CNPS IB.1	Valley/foothill grasslands, on dry sites. Extant in Alameda, Contra Costa, and San Joaquin counties. Believed extirpated in Stanislaus and Solano counties.	July-October annual herb	Not expected: no suitable habitat present.
<i>Centromadia parryi</i> ssp. <i>congdonii</i> Congdon's tarplant	Federal: None State: CEQA CNPS IB.2	Valley/foothill grasslands on alkaline soils. Restricted to San Luis Obispo, Monterey, Alameda, Contra Costa, San Mateo, and Santa Clara counties; presumed extirpated in Santa Cruz and Solano counties.	June-November annual herb	Not expected: no suitable habitat present.
<i>Cirsium andrewsii</i> Francescan thistle	Federal: None State: CEQA CNPS IB.2; YBC	Bluffs, ravines and seeps in broadleafed upland forest, coastal prairie, coastal bluff scrub/mesic, sometimes on serpentine. Restricted to Marin, San Francisco, San Mateo, Contra Costa, and Sonoma counties.	March-July perennial herb	Low: marginally suitable habitat present. Would have been detectable - presumed absent.
<i>Cirsium fontinale</i> var. <i>campylon</i> Mount Hamilton thistle	Federal: None State: CEQA CNPS IB.2	Chaparral, cismontane woodland, valley/foothill grassland, in serpentine seeps. Restricted to Alameda, Santa Clara and Stanislaus counties.	April-October perennial herb	Not expected: no suitable habitat present.

Family Scientific Name Common Name	Status <sup>1</sup>	Habitat Affinities and Reported Localities in the Project Area	Comments	Potential for Occurrence On Site
<i>Cirsium occidentale</i> var. <i>compactum</i> compact cobwebby thistle	<b>Federal:</b> None <b>State:</b> CEQA <b>CNPS</b> 1B.2	Chaparral, Coastal dunes, Coastal prairie, Coastal scrub, 5 - 150 meters from fewer than twenty occurrences. Monterey, San Francisco, San Luis Obispo.	Apr-Jun perennial herb	Very low: marginally suitable habitat present. Would have been detectable - presumed absent.
<i>Deinandra baicalupitii</i> Livermore tarplant	<b>Federal:</b> None <b>State:</b> CEQA <b>CNPS</b> 1B.2	Alkaline meadows. Known from fewer than five occurrences near Livermore, Alameda County.	June-October annual herb	Not expected: no suitable habitat present.
<i>Grindelia hirsutula</i> var. <i>maritima</i> San Francisco gum-plant	<b>Federal:</b> None <b>State:</b> CEQA <b>CNPS</b> 1B.2; YBC	Coastal bluff scrub, coastal scrub, valley/foothill grassland, on sandy or serpentine slopes. Found near the coast from San Luis Obispo to Marin counties.	August-September perennial herb	Moderate: suitable habitat present. Would have been detectable - presumed absent.
<i>Helianthella castanea</i> Diablo helianthella	<b>Federal:</b> None <b>State:</b> CEQA <b>CNPS</b> 1B.2	Broadleaf upland forest, chaparral, cismontane woodland, coastal scrub, riparian woodland, and valley/foothill grassland. Occurs in Alameda, Contra Costa and San Mateo counties; presumed extirpated in Marin and San Francisco counties.	April-June perennial herb	Very low: marginally suitable habitat present. Would have been detectable - presumed absent.
<i>Heimizonia congesta</i> ssp. <i>congesta</i> pale yellow hayfield tarplant	<b>Federal:</b> None <b>State:</b> CEQA <b>CNPS</b> 1B.2	Valley and foothill grassland, sometimes roadsides Mendocino, Marin, San Francisco, Sonoma	April - November annual herb	Not expected: no suitable habitat present.
<i>Hesperivax sparsiflora</i> var. <i>brevifolia</i> short-leaved evax	<b>Federal:</b> None <b>State:</b> CEQA <b>CNPS</b> 1B.2	Coastal bluff scrub and dunes, in sandy soils. Recorded from Humboldt, Mendocino, Marin, Santa Cruz, San Francisco, and Sonoma counties and Oregon.	April-June annual herb	Low: marginally suitable habitat present. Would have been detectable - presumed absent.
<i>Holocarpha macradenia</i> Santa Cruz tarplant	<b>Federal:</b> FT <b>State:</b> CE <b>CNPS</b> 1B.1	Coastal prairie, valley/foothill grassland, often on heavy clay soils. Known from coastal areas of Contra Costa, Monterey and Santa Cruz counties; presumed extirpated in Alameda and Marin counties.	June-October annual herb	Not expected: no suitable habitat present.
<i>Lasthenia conjugens</i> Contra Costa goldfields	<b>Federal:</b> FE <b>State:</b> CEQA <b>CNPS</b> 1B.1	Mesic sites in valley/foothill grassland, vernal pools. Known from Napa, Solano, Sonoma, Marin and Monterey counties and recently rediscovered in Alameda and Contra Costa counties. Presumed extirpated in Mendocino, Santa Barbara and Santa Clara counties.	March-June annual herb	Not expected: no suitable habitat present.



Family Scientific Name Common Name	Status <sup>1</sup>	Habitat Affinities and Reported Localities in the Project Area	Comments	Potential for Occurrence On Site
<i>Layia carnosa</i> beach layia	Federal: FE State: CE CNPS 1B.1	Coastal dunes. Found from Humboldt to Monterey counties; presumed extirpated in San Francisco and Santa Barbara counties.	May-July annual herb	Very low: marginally suitable habitat present. Would have been detectable - presumed absent.
<i>Lessingia germanorum</i> San Francisco lessingia	Federal: FE State: CE CNPS 1B.1; YBC	Coastal scrub, sandy flats and remnant dunes. Restricted to San Francisco and San Mateo counties. Known from only four occurrences at the Presidio and one at western base of San Bruno Mountain.	August-November annual herb	Very low: marginally suitable habitat present. Would have been detectable - presumed absent.
<i>Lessingia hololeuca</i> woolly-headed lessingia	Federal: None State: CEQA CNPS 3	Coastal scrub, valley/foothill grasslands on clay and serpentine. Found from Monterey to Napa counties.	June-October annual herb	Very low: marginally suitable habitat present. Would have been detectable - presumed absent.
<i>Microseris amphibolus</i> Mount Diablo cottonwood	Federal: None State: CEQA CNPS 3.2	Broadleaf upland forest, cismontane woodland, valley/foothill grassland. Known from Lake to Santa Cruz counties, San Francisco Bay Area. Documented on Angel Island.	April-May annual herb	Low: marginally suitable habitat present. Would have been detectable - presumed absent.
<i>Microseris paludosa</i> marsh microseris	Federal: None State: CEQA CNPS 1B.2	Moist grassland, open woods, closed-cone coniferous forest, and coastal scrub near the coast. Distributed from Monterey to Sonoma counties and the San Francisco Bay. Presumed extirpated from San Francisco Co.	May-June (July perennial herb	Very low: marginally suitable habitat present. Would have been detectable - presumed absent.
<i>Pentachaeta bellidiflora</i> white-rayed pentachaeta	Federal: FE State: CE CNPS 1B.1	Open dry rocky slopes, valley/foothill grassland, often on serpentine. Restricted to San Mateo County; presumed extirpated in San Francisco, Marin, and Santa Cruz counties.	March-May annual herb	Not expected: no suitable habitat present.
<i>Stebbinsiopsis decipiens</i> Santa Cruz microseris	Federal: None State: CEQA CNPS 1B.2	Broadleaf and coniferous forest, chaparral, coastal prairie, coastal scrub, in open areas, on loose soil, sometimes serpentine. Recorded in Monterey, Marin, and Santa Cruz counties. Recorded on Angel Island.	April-May annual herb	Low: marginally suitable habitat present. Would have been detectable - presumed absent.

Family Scientific Name Common Name	Status <sup>1</sup>	Habitat Affinities and Reported Localities in the Project Area	Comments	Potential for Occurrence On Site
<i>Symphoricarpos lentum</i> (= <i>Aster</i> <i>lentus</i> ) Suisun Marsh aster	Federal: None State: CEQA CNPS 1B.2	Freshwater and brackish marshes. Known from the Napa River and San Joaquin/Sacramento River Delta.	May-November perennial herb	Not expected: no suitable habitat present.
<i>Tanacetum canphorum</i> dune tansy	Federal: None State: None CNPS YBC	Coastal dunes, coastal strand, on sandy flats. Found from the Central Coast to Oregon. Considered for listing by the CNPS but rejected: too common.	June-September perennial herb	Low: marginally suitable habitat present. Would have been detectable - presumed absent.
<b>Boraginaceae - Borage Family</b>				
<i>Anisackia grandiflora</i> large-flowered fiddleneck	Federal: FE State: CE CNPS 1B.1	Cismontane woodland, valley/foothill grassland. Known from only three natural occurrences in Alameda and San Joaquin counties. Also known historically from Contra Costa County, where it has been recently re-introduced.	April-May annual herb	Not expected: no suitable habitat present.
<i>Anisackia lunaris</i> bent-flowered fiddleneck	Federal: None State: CEQA CNPS 1B.2	Open woods, valley/foothill grasslands. Reported from the vicinity of the San Francisco Bay to Lake, Shasta and Siskiyou counties.	March-June annual herb	Not expected: no suitable habitat present.
<i>Plagiobothrys chorisianus</i> var. <i>chorisianus</i> Choris's popcorn-flower	Federal: None State: CEQA CNPS 1B.2	Chaparral, Coastal prairie, Coastal scrub /mesic. 0-150 m. Santa Cruz, San Francisco, San Mateo	Mar-June annual herb	Very low: marginally suitable habitat present. Would have been detectable - presumed absent.
<i>Plagiobothrys diffusus</i> San Francisco popcorn-flower	Federal: None State: CE CNPS 1B.1	Coastal prairie and possibly valley/Foothill grassland, on clay soils. Known from only 6 occurrences in Santa Cruz County; presumed to be extirpated in San Francisco County.	April-June annual herb	Not expected: no suitable habitat present.
<i>Plagiobothrys glaber</i> hairless popcorn-flower	Federal: None State: CEQA CNPS 1A	Alkaline meadows and vernal coastal saltmarshes. Presumed extinct. Once occurred in Alameda, Merced, Marin, San Benito, and Santa Clara counties.	April-May annual herb	Not expected: no suitable habitat present.

Family Scientific Name Common Name	Status <sup>1</sup>	Habitat Affinities and Reported Localities in the Project Area	Comments	Potential for Occurrence On Site
<b>Brassicaceae - Mustard Family</b>				
<i>Arabis blepharophylla</i> coast rock cress	Federal: None State: CEQA CNPS 4; YBC	Coastal prairie, coastal scrub, rocky coastal bluffs, grassy slopes, broadleaf upland forest. Known from Santa Cruz to Sonoma, including San Francisco and Contra Costa counties.	February-April perennial herb	Low: marginally suitable habitat present. Would have been detectable - presumed absent.
<i>Caulanthus coulteri</i> var. <i>lemmonii</i> Lemmon's jewelflower	Federal: None State: CEQA CNPS 1B.2	Pinon and juniper woodland, valley and foothill grassland. Known from the San Joaquin Valley and the Central Coast. Extirpated in Alameda county.	March-May annual herb	Not expected: no suitable habitat present.
<i>Erysimum franciscanum</i> San Francisco wallflower	Federal: None State: CEQA CNPS 4.2; YBC	Coastal dunes, coastal scrub, valley/foothill grassland often on serpentine or granitic soils. Restricted to near the coast from Santa Cruz to Sonoma counties, including San Francisco and Santa Clara Counties.	March-June perennial herb	Low: marginally suitable habitat present. Would have been detectable - presumed absent.
<i>Streptanthus albidus</i> sp. <i>peramoenus</i> most beautiful jewel-flower	Federal: None State: CEQA CNPS 1B.2	Chaparral, cismontane woodland and valley/foothill grasslands on serpentine. Known from Alameda, Santa Clara and Contra Costa counties.	April-June annual herb	Not expected: no suitable habitat present.
<i>Streptanthus niger</i> Tiburon jewel-flower	Federal: FE State: CE CNPS 1B.1	Valley/foothill grassland, on serpentine. Known from only three occurrences in Marin County.	May-June annual herb	Not expected: no suitable habitat present.
<i>Tropidocarpum capparidium</i> caper-fruited tropidocarpum	Federal: None State: CEQA CNPS 1B	Valley/foothill grasslands, on alkaline hills. Known historically from Alameda, Contra Costa, Glenn, Santa Clara and San Joaquin counties; last seen in Contra Costa County in 1957. Once presumed extinct, but rediscovered in Monterey County in 2000 and subsequently in San Luis Obispo and Fresno counties.	March-April annual herb	Not expected: no suitable habitat present.
<b>Campanulaceae - Bellflower Family</b>				
<i>Campanula exigua</i> chaparral harebell	Federal: None State: CEQA CNPS 1B.2	Chaparral, rocky, usually serpentine sites. Known from Contra Costa county to San Benito County, and Stanislaus county.	May-June annual herb	Not expected: no suitable habitat present.



Family Scientific Name Common Name	Status <sup>1</sup>	Habitat Affinities and Reported Localities in the Project Area	Comments	Potential for Occurrence On Site
<b>Caprifoliaceae - Honeysuckle Family</b>				
<i>Viburnum ellipticum</i> oval-leaved viburnum	Federal: None State: CEQA CNPS 2.3	Chaparral, cismontane woodland, lower montane coniferous forests. Reported from the Coast Ranges in Contra Costa, Sonoma, Napa, Mendocino, Glen, and Humboldt counties; in the Sierra Nevada in Fresno and El Dorado counties; and Shasta County into Oregon and Washington.	May-June shrub (deciduous)	Not expected: no suitable habitat present.
<b>Caryophyllaceae - Pink Family</b>				
<i>Arenaria paludicola</i> marsh sandwort	Federal: FE State: CE CNPS 1B.1	Freshwater marsh and swamps. Last known extant population located on Nipomo Mesa, San Luis Obispo County. Presumed extirpated in Los Angeles, San Bernardino, Santa Cruz and San Francisco counties.	May-August perennial herb	Not expected: no suitable habitat present.
<i>Silene verucunda</i> ssp. <i>verucunda</i> San Francisco campion	Federal: None State: CEQA CNPS 1B.2; YBC	Coastal bluffs, coastal scrub, dunes, on sandy or rocky soils. Known from fewer than 20 occurrences in Santa Cruz, San Mateo and San Francisco counties.	March-June perennial herb	Low: marginally suitable habitat present. Would have been detectable - presumed absent.
<i>Spargularia macrotheca</i> var. <i>macrotheca</i> large flowered sand-spurry	Federal: None State: None CNPS EBCNPS - A2	Alkali areas; coastal bluff; rock, talus or scree; wetlands; from sea level to 820 feet. Detected previously on Yerba Buena Is. Coastal California counties	perennial herb	Detected: suitable habitat present.
<i>Stellaria littoralis</i> beach starwort	Federal: None State: CEQA CNPS 4; YBC	Bogs, fens, marshes, swamps, coastal scrub and dunes. Restricted to San Francisco to Sonoma counties and Humboldt County. Believed extirpated in Mendocino County.	March-July perennial herb	Low: marginally suitable habitat present. Would have been detectable - presumed absent.
<b>Chenopodiaceae - Goosefoot Family</b>				
<i>Atriplex cordulata</i> heartscale	Federal: None State: CEQA CNPS 1B.2	Chenopod scrub, valley/foothill grassland, on somewhat alkaline or saline hard packed soils. Widespread in the Central Valley from Glenn to Kern counties and into Alameda and Contra Costa counties. Presumed extirpated in Stanislaus, Yolo, and San Joaquin counties.	May-October annual herb	Not expected: no suitable habitat present.
<i>Atriplex coronata</i> var. <i>coronata</i> crownscale	Federal: None State: CEQA CNPS 4.2	Chenopod scrub, valley/foothill grassland on alkaline soils. Known from the northern San Joaquin Valley, Central Coast, and eastern San Francisco Bay.	April-October annual herb	Not expected: no suitable habitat present.

Family Scientific Name Common Name	Status <sup>1</sup>	Habitat Affinities and Reported Localities in the Project Area	Comments	Potential for Occurrence On Site
<i>Atriplex depressa</i> brittlescale	Federal: None State: CEQA CNPS 1B.2	Chenopod scrub, playas and valley/foothill grassland on alkaline and clay soils. Widespread in the Sacramento and San Joaquin Valleys, and into Alameda and Contra Costa counties. Presumed extirpated in Stanislaus County.	May-October annual herb	Not expected: no suitable habitat present.
<i>Atriplex joaquiniana</i> San Joaquin sparscale	Federal: None State: CEQA CNPS 1B.2	Chenopod scrub, valley/foothill grassland and alkali meadows. Widespread in the Sacramento and San Joaquin valleys, into Alameda and Contra Costa counties, north to Napa County and south to Monterey and San Benito counties. Presumed extirpated in Santa Clara, San Joaquin and Tulare counties.	April-September annual herb	Not expected: no suitable habitat present.
<i>Suaeda californica</i> California seablite	Federal: FE State: CEQA CNPS 1B.1; YBC	Coastal saltmarshes. Natural populations extirpated from San Francisco, Alameda, and Santa Clara counties. Recently reintroduced in San Francisco and Alameda Counties. Restricted to Morro Bay, San Luis Obispo County.	July-October shrub (evergreen)	Low: marginally suitable habitat present. Would have been detectable - presumed absent.
<b>Convulvaceae - Morning-glory Family</b>				
<i>Calystegia purpurata</i> sp. <i>saxicola</i> coastal bluff morning-glory	Federal: None State: CEQA CNPS 1B.2	Coastal dunes and scrub. Known from Mendocino, Marin, and Sonoma counties.	May-August perennial herb	Moderate: marginally suitable habitat present. Would have been detectable - presumed absent.
<b>Ericaceae - Heath Family</b>				
<i>Arctostaphylos hookeri</i> sp. <i>franciscana</i> Franciscan manzanita	Federal: None State: CEQA CNPS 1A	Coastal scrub (serpentine); elevation 60-300 meters. Last seen in 1942. Presumed extinct in the wild, plant now occurs only in cultivation.	February-April evergreen shrub	Not expected: no suitable habitat present.
<i>Arctostaphylos hookeri</i> sp. <i>ravenii</i> Presidio manzanita	Federal: None State: CE CNPS 1B.1; YBC	Chaparral, coastal prairie, coastal scrub/serpentine outcrop; elevation 45-215 meters. Known from only one extant native occurrence at the Presidio in San Francisco; plants there belong to a single clone.	February-March evergreen shrub	Not expected: no suitable habitat present.
<i>Arctostaphylos umbellata</i> San Bruno Mt. manzanita	Federal: None State: CE CNPS 1B.1	Chaparral, rocky coastal scrub. Known from 5 occurrences on San Bruno Mountain, San Mateo County.	February-May evergreen shrub	Not expected: no suitable habitat present.

Family Scientific Name Common Name	Status <sup>1</sup>	Habitat Affinities and Reported Localities in the Project Area	Comments	Potential for Occurrence On Site
<i>Arctostaphylos montaraensis</i> Montara manzanita	Federal: None State: CEQA CNPS 1B.2	Maritime chaparral and coastal scrub on slopes and ridges. Known from approximately 10 occurrences on San Bruno and Montara mountains, San Mateo County.	January-March evergreen shrub	Not expected: no suitable habitat present.
<i>Arctostaphylos pacifica</i> Pacific manzanita	Federal: None State: CE CNPS 1B.2	Chaparral, Coastal scrub; 330 meters known only from San Bruno Mountain in San Mateo County.	Feb-Apr perennial shrub	Not expected: no suitable habitat present.
<i>Arctostaphylos pallida</i> pallid manzanita	Federal: FT State: CE CNPS 1B.1	Broadleaved upland forest, cismontane woodland, chaparral and coastal scrub, on siliceous shale, sandy and gravelly soils on uplifted Marine terraces. Restricted to Alameda and Contra Costa counties.	December-March evergreen shrub	Not expected: no suitable habitat present.
<b>Fabaceae - Pea Family</b>				
<i>Astragalus nuttallii</i> var. <i>nuttallii</i> Nuttall's milk-vetch	Federal: None State: CEQA CNPS 4.2	Coastal bluff scrub and coastal dunes. Known from San Mateo to Santa Barbara counties. Possibly extirpated in San Francisco and Alameda counties.	January-November perennial herb	Very low: marginally suitable habitat present. Would have been detectable - presumed absent.
<i>Astragalus tener</i> var. <i>tener</i> alkali milk-vetch	Federal: None State: CEQA CNPS 1B.2	Playas, valley and foothill grassland (adobe clay), vernal pools/ alkaline; elevation 1-60 meters. Once widespread from San Francisco to Monterey and San Benito counties and north to Napa and Yolo counties. Extirpated from much of its former range. Extant in Alameda, Napa, Merced, Yolo, and Solano counties.	March-June annual herb	Not expected: no suitable habitat present.
<i>Hoita strobilina</i> Loma Prieta hoita	Federal: None State: CEQA CNPS 1B.1	Chaparral, cismontane and riparian woodland, usually in mesic areas on serpentine soil. Recorded from Santa Clara and Santa Cruz counties. Believed extirpated in Alameda and Contra Costa counties.	May-October perennial herb	Not expected: no suitable habitat present.
<i>Lathyrus jepsonii</i> var. <i>jepsonii</i> Delta tule pea	Federal: None State: CEQA CNPS 1B.2	Freshwater and brackish marshes. Occurs throughout the Sacramento San Joaquin River delta, San Francisco Bay and Central Valley.	May-September perennial herb	Not expected: no suitable habitat present.



Family Scientific Name Common Name	Status <sup>1</sup>	Habitat Affinities and Reported Localities in the Project Area	Comments	Potential for Occurrence On Site
<i>Lotus formosissimus</i> slender trefoil	Federal: None State: CEQA CNPS 4.2	Broadleaved upland forest; Coastal bluff scrub; Closed-cone coniferous forest; Cismontane woodland; Coastal prairie; Coastal scrub, Meadows and seeps; Marshes and swamps; North Coast coniferous forest; Valley and foothill grassland/wetlands, roadsides; 0 - 700 meters. Coastal California counties from San Luis Obispo north through OR and WA	Mar-Jul rhizomatous herb	Low: marginally suitable habitat present. Would have been detectable - presumed absent.
<i>Trifolium amoenum</i> showy Indian clover	Federal: FE State: CEQA CNPS 1B.1	Valley/foothill grasslands, in sunny open sites, sometimes on serpentine. Rediscovered in Sonoma County in 1993, believed extirpated in Alameda, Mendocino, Marin, Napa, Santa Clara and Solano counties.	April-June annual herb	Not expected: no suitable habitat present.
<i>Trifolium depauperatum</i> var. <i>hydrophilum</i> saline clover	Federal: None State: CEQA CNPS 1B.2	Marshes, swamps, valley and foothill grassland (mesic, alkaline), and vernal pools. Known from the San Francisco Bay area south to San Luis Obispo county. Possibly in Colusa county.	April-June annual herb	Not expected: no suitable habitat present.
<b>Geraniaceae - Geranium Family</b>				
<i>California macrophylla</i> round-leaved filaree	Federal: None State: CEQA CNPS 1B.1	Cismontane woodland, valley and foothill grasslands, on clay soil. Widespread throughout California, Baja California, Oregon, Utah, and other states.	March-May annual herb	Not expected: no suitable habitat present.
<b>Hydrophyllaceae - Waterleaf Family</b>				
<i>Phacelia malvifolia</i> stinging phacelia	Federal: None State: None CNPS EB-CNP S - A2	Redwood forest, mixed evergreen forest, closed-cone pine forest, northern coastal scrub; gravel; sand or sandstone. Coastal California counties. Observed on Yerba Buena Is. during previous botanical surveys.	annual herb	Detected: suitable habitat present.
<i>Phacelia phacelioides</i> Mount Diablo phacelia	Federal: SC State: CEQA CNPS 1B.2	Chaparral and cismontane woodland on rocky sites. Recorded from Contra Costa, San Benito, Santa Clara and Stanislaus counties.	April-May annual herb	Not expected: no suitable habitat present.

Family Scientific Name Common Name	Status <sup>1</sup>	Habitat Affinities and Reported Localities in the Project Area	Comments	Potential for Occurrence On Site
<b>Lamiaceae - Mint Family</b>				
<i>Acanthomintha lanceolata</i> Santa Clara thorn-mint	Federal: None State: CEQA CNPS 4.2	Chaparral, coastal scrub, and cismontane woodland on rocky sites, often on serpentine. Recorded from Alameda, Fresno, Merced, Monterey, San Benito, Santa Clara, and Stanislaus counties.	March-June annual herb	Not expected: no suitable habitat present.
<i>Monardella antonina</i> sp. antonina San Antonio Hills monardella	Federal: None State: CEQA CNPS 3	Chaparral and cismontane woodland. Recorded from Monterey County; possible also in Alameda, Contra Costa, San Benito and Santa Clara counties.	June-August perennial herb (rhizomatous)	Not expected: no suitable habitat present.
<i>Monardella undulata</i> curly-leaved monardella	Federal: None State: CEQA CNPS 4.2	Chaparral, coastal dunes, coastal scrub, lower montane coniferous forests (ponderosa pine sand hills), on sandy soils. Recorded from Sonoma to Santa Barbara counties.	May-July annual herb	Low: marginally suitable habitat present. Would have been detectable - presumed absent.
<i>Monardella villosa</i> sp. <i>globosa</i> robust monardella	Federal: None State: CEQA CNPS 1B.2	Openings in chaparral, cismontane woodland. Occurs from the San Francisco Bay Area to Humboldt County.	June-July perennial herb (rhizomatous)	Not expected: no suitable habitat present.
<b>Linaceae - Flax Family</b>				
<i>Hesperolinon congestum</i> Marin western flax	Federal: FT State: CT CNPS 1B.1; YBC	Valley/foothill grassland and chaparral on serpentine. Known from fewer than 20 occurrences in Marin, San Francisco and San Mateo counties.	May-July annual herb	Not expected: no suitable habitat present.
<b>Malvaceae - Mallow Family</b>				
<i>Malacothamnus arcuatus</i> arcuate bush mallow	Federal: None State: none CNPS 1B.2	Chaparral. Restricted to Santa Clara, Santa Cruz and San Mateo counties.	April-July shrub (evergreen)	Not expected: no suitable habitat present.
<i>Sidalcea hickmanii</i> sp. <i>viridis</i> Marin checkerbloom	Federal: None State: CEQA CNPS 1B.3	Chaparral on dry coastal ridges on serpentine. Known from Marin, Napa, San Francisco, San Mateo and Sonoma counties.	May-June perennial herb	Not expected: no suitable habitat present.

Family Scientific Name Common Name	Status <sup>1</sup>	Habitat Affinities and Reported Localities in the Project Area	Comments	Potential for Occurrence On Site
<b>Onagraceae - Evening Primrose Family</b>				
<i>Clarkia concinna</i> sp. <i>automika</i> Santa Clara red-ribbons	Federal: None State: CEQA CNPS 4.3	Chaparral and estmontane woodland. Restricted to Santa Clara and Alameda counties.	April-July annual herb	Not expected: no suitable habitat present.
<i>Clarkia franciscana</i> Presidio clarkia	Federal: FE State: CE CNPS 1B.1; YBC	Coastal scrub, valley/foothill grassland, on serpentine. Known from fewer than five occurrences in Alameda and San Francisco counties.	May-July annual herb	Not expected: no suitable habitat present.
<b>Papaveraceae - Poppy Family</b>				
<i>Eschscholzia rhombipetala</i> diamond-petaled California poppy	Federal: None State: CEQA CNPS 1B.1	Valley/foothill grassland on clay soils. Was presumed extinct before recent rediscovery in Corral Hollow in Alameda County, and in San Luis Obispo County. Also known historically from Contra Costa, Colusa, and Stanislaus counties.	March-April annual herb	Not expected: no suitable habitat present.
<i>Meconella oregana</i> Oregon meconella	Federal: None State: CEQA CNPS 1B.1	Coastal prairie and scrub. Known in California only from five occurrences in Contra Costa and Santa Clara counties. Also recorded in Oregon, Washington, and other states.	March-April annual herb	Not expected: no suitable habitat present.
<b>Polemoniaceae - Phlox Family</b>				
<i>Gilia capitata</i> sp. <i>chamissonis</i> dune gilia	Federal: None State: CEQA CNPS 1B.1; YBC	Coastal dunes and scrub. Northern portion of the Central Coast from San Francisco to Bodega Bay. Once very common on the San Francisco dunes. Widespread in the Presidio on stabilized dunes. Documented on Yerba Buena Island outside study area during previous botanical surveys.	May-July annual herb	Moderate: marginally suitable habitat present. Would have been detectable - presumed absent.
<i>Gilia millefoliata</i> dark-eyed gilia	Federal: None State: CEQA CNPS 1B.2	Coastal strand, stabilized coastal dunes. Believed extirpated in San Francisco County. Distributed from the San Francisco Bay to Del Norte County.	April-June annual herb	Very low: suitable habitat present. Would have been detectable - presumed absent.
<i>Leptostaphyon grandiflorus</i> ( <i>L. lananthus grandiflorus</i> ) large-flowered lananthus	Federal: None State: CEQA CNPS 4.2	Coastal bluff scrub, closed-cone coniferous forest, coastal dunes, coastal prairie, coastal scrub, valley/foothill grassland. Known from Sonoma to San Luis Obispo counties and the San Joaquin Valley.	April-July annual herb	Low: marginally suitable habitat present. Would have been detectable - presumed absent.



Family Scientific Name Common Name	Status <sup>1</sup>	Habitat Affinities and Reported Localities in the Project Area	Comments	Potential for Occurrence On Site
<i>Leptosiphon rosaceus</i> (= <i>Linanthus rosaceus</i> ) rose lnanthus	Federal: None State: CEQA CNPS IB.1	Coastal bluff scrub; elevation 0-100 meters. Several populations documented in 2001-2003 near Point Reyes. Presumed extant in Marin and San Mateo counties, possibly extirpated in Sonoma and San Francisco counties.	April-June annual herb	Low: marginally suitable habitat present. Would have been detectable - presumed absent.
<b>Polygonaceae - Buckwheat Family</b>				
<i>Chorizanthe cuspidata</i> var. <i>cuspidata</i> San Francisco Bay spineflower	Federal: None State: CEQA CNPS IB.2; YBC	Coastal bluff scrub, coastal dunes, coastal prairie, coastal scrub/ sandy; elevation 3-215 meters. Known from Marin, San Francisco and San Mateo counties. Possibly in Santa Clara and Sonoma counties. Considered extirpated from Alameda County.	April-August annual herb	Low: marginally suitable habitat present. Would have been detectable - presumed absent.
<i>Chorizanthe robusta</i> var. <i>robusta</i> robust spineflower	Federal: FE State: CEQA CNPS IB.1	Openings and sandy locations in cismontane woodland, coastal dunes, and coastal scrub. Historically from Santa Cruz to Sonoma counties. Believed extirpated from San Francisco, Alameda, Santa Clara, and San Mateo counties.	May-September annual herb	Very low: marginally suitable habitat present. Would have been detectable - presumed absent.
<i>Eriogonum luteolum</i> var. <i>caninum</i> Tiburon buckwheat	Federal: None State: CEQA CNPS IB.2	Chaparral, coastal prairie, valley/foothill grassland on serpentine. Known from Colusa and Lake counties to San Mateo County.	June-September annual herb	Not expected: no suitable habitat present.
<b>Primulaceae - Primrose Family</b>				
<i>Androsace elongata</i> sp. <i>acuta</i> California androsace	Federal: None State: CEQA CNPS 4.2	Chaparral, cismontane woodland and coastal scrub. Known from the Bay Area and Central Coast to Siskiyou and San Diego counties.	March-June annual herb	Not expected: no suitable habitat present.
<b>Ranunculaceae - Buttercup Family</b>				
<i>Delphinium californicum</i> sp. <i>interius</i> Hospital Canyon larkspur	Federal: SC State: CEQA CNPS IB.2	Cismontane woodland, possible on mesic sites. Recorded from Alameda, Contra Costa, Santa Clara, San Joaquin, and San Luis Obispo counties.	April-June perennial herb	Not expected: no suitable habitat present.
<i>Delphinium recurvatum</i> recurved larkspur	Federal: None State: CEQA CNPS IB.2	Chenopod scrub, cismontane woodland and Valley/ foothill grassland, in alkaline places. Restricted to the Central Valley from Colusa to Kern counties, San Luis Obispo.	March-May perennial herb	Not expected: no suitable habitat present.

Family Scientific Name Common Name	Status <sup>1</sup>	Habitat Affinities and Reported Localities in the Project Area	Comments	Potential for Occurrence On Site
<i>Myosurus minimus</i> ssp. <i>apus</i> little mouse-tail	Federal: None State: CEQA CNPS 3.1	Alkaline vernal pools. Recorded throughout the Central Valley.	March-June annual herb	Not expected: no suitable habitat present.
<b>Rosaceae - Rose Family</b>				
<i>Horkelia cuneata</i> ssp. <i>sericea</i> Kellogg's horkelia	Federal: None State: CEQA CNPS 1B.1; YBC	Closed-cone coniferous forest, old dunes and coastal scrub. Restricted to coastal areas from Santa Barbara to San Mateo counties; presumed extirpated in San Francisco, Alameda, and Marin counties.	April-September perennial herb	Very low: suitable habitat present. Would have been detectable - presumed absent.
<b>Scrophulariaceae - Figwort Family</b>				
<i>Castilleja affinis</i> ssp. <i>neglecta</i> Tiburon Indian paint brush	Federal: FE State: CT CNPS 1B.2	Valley and foothill grassland, rocky serpentine sites. Known from only six occurrences in Marin, Napa, and Santa Clara counties.	April-June perennial herb	Not expected: no suitable habitat present.
<i>Collinsia cymbosa</i> round-headed Chinese houses	Federal: None State: CEQA CNPS 1B.2	Coastal dunes. Restricted to Humboldt, Mendocino, Sonoma and possibly Marin counties. Believed extirpated in San Francisco county.	April-June annual herb	Not expected: no suitable habitat present.
<i>Collinsia multicolor</i> San Francisco collinsia	Federal: None State: CEQA CNPS 1B.2; YBC	Closed cone coniferous forest and coastal scrub, on moist, more or less shady sites. Restricted to Monterey, Santa Cruz, San Francisco and San Mateo counties.	March-May annual herb	Low: marginally suitable habitat present. Would have been detectable - presumed absent.
<i>Cordylanthus maritimus</i> ssp. <i>palustris</i> Pt. Reyes bird's-beak	Federal: None State: CEQA CNPS 1B.2; YBC	Coastal saltmarsh. Believed extant in Humboldt, Marin and Sonoma counties; presumed extirpated in Alameda, Santa Clara and San Mateo counties. Reintroduced at Cissy Field in San Francisco in 2002.	May-October annual herb (hemiparasite)	Low: marginally suitable habitat present. Would have been detectable - presumed absent.
<i>Tringoides floribunda</i> San Francisco owl's clover	Federal: None State: CEQA CNPS 1B.2; YBC	Coastal prairie, foothill/Valley grassland, on clay or serpentine. Known from Marin, San Francisco and San Mateo counties.	April-May annual herb	Not expected: no suitable habitat present.

Family Scientific Name Common Name	Status <sup>1</sup>	Habitat Affinities and Reported Localities in the Project Area	Comments	Potential for Occurrence On Site
<b>Thymelaeaceae - Mezereum Family</b>				
<i>Dicra occidentalis</i> western leatherwood	Federal: None State: CEQA CNPS 1B.2	Broadleaf upland forest, closed cone woodland, North Coast coniferous forest, riparian forest, and riparian woodland. Restricted to brushy slopes and mesic sites. Known from San Mateo to Sonoma counties.	January-April shrub (deciduous)	Low: marginally suitable habitat present. Would have been detectable - presumed absent.
<b>Equisetaceae - Horsetail Family</b>				
<i>Equisetum palustre</i> marsh horsetail	Federal: None State: CEQA CNPS 3	Marshes and swamps. Known from San Mateo, San Francisco and Lake counties and Oregon.	Unknown perennial herb (rhizomatous)	Not expected: no suitable habitat present.
<b>Pteridaceae - Fern Family</b>				
<i>Aspidotis carthagen-halliae</i> Carthagen Hall's lace fern	Federal: None State: CEQA CNPS 4.2	Chaparral, cismontane woodland, generally on serpentine. Restricted to Alameda, Marin, Monterey, San Benito and San Luis Obispo counties.	January-December perennial herb (rhizomatous)	Not expected: no suitable habitat present.
<b>Cyperaceae - Sedge Family</b>				
<i>Carex comosa</i> bristly sedge	Federal: None State: CEQA CNPS 2.1	Marshes and swamps, lake margins. Believed extirpated in San Francisco, San Bernardino and Santa Cruz counties. Extant in Contra Costa, Lake, Shasta, San Joaquin and Sonoma counties.	May-September perennial herb (rhizomatous)	Not expected: no suitable habitat present.
<b>Iridaceae - Iris Family</b>				
<i>Iris longipetala</i> Coast iris	Federal: None State: CEQA CNPS 4.2	Coastal prairie, lower montane coniferous forest, meadows and seeps Known from central North Coast to central Central Coast, southern Outer North Coast Range, and San Francisco Bay Area.	March-May perennial herb (rhizomatous)	Not expected: no suitable habitat present.
<b>Liliaceae - Lily Family</b>				
<i>Allium shastense</i> Shastense onion	Federal: None State: CEQA CNPS 1B.3	Chaparral, Cismontane woodland usually on serpentine, rocky. 400 - 1200 meters Mt. Hamilton, Alameda County	Mar-May bulbiferous herb Known only from the Mt. Hamilton Range.	Not expected: no suitable habitat present.
<i>Calochortus pulchellus</i> Mount Diablo fairy-lantern	Federal: None State: CEQA CNPS 1B.2	Chaparral, cismontane woodland, valley/foothill grassland. Known from Contra Costa and possibly Solano counties.	April-June perennial herb (bulbiferous)	Not expected: no suitable habitat present.



Family Scientific Name Common Name	Status <sup>1</sup>	Habitat Affinities and Reported Localities in the Project Area	Comments	Potential for Occurrence On Site
<i>Calochortus tiburonensis</i> Tiburon Mariposa lily	Federal: FT State: CT CNPS 1B.1	Valley/foothill grassland, on serpentine. Known only from Ring Mountain Preserve, Tiburon, Marin County.	March-June perennial herb (bulbiferous)	Not expected: no suitable habitat present.
<i>Calochortus umbellatus</i> Oakland star-tulip	Federal: None State: CEQA CNPS 4.2	Broadleaved and upland forest, chaparral, lower montane coniferous forest, valley/foothill grassland, often on serpentine. Known from Alameda, Contra Costa, Marin, Santa Clara and San Mateo counties. Presumed extirpated in Santa Cruz County.	March-May perennial herb (bulbiferous)	Not expected: no suitable habitat present.
<i>Frithillaria tiliacea</i> fragrant fritillary	Federal: None State: CEQA CNPS 1B.2; YBC	Coastal prairie, coastal scrub, valley/foothill grassland near the coast, on clay or serpentine. Known from the Central Coast from Sonoma to Monterey counties and the San Francisco Bay Area.	February-April perennial herb (bulbiferous)	Low: marginally suitable habitat present. Would have been detectable - presumed absent.
<i>Lilium maritimum</i> coast lily	Federal: None State: CEQA CNPS 1B.1	Coastal prairie, coastal scrub, bogs, closed-cone coniferous forest, broadleaved upland forest, and North Coast coniferous forest. Restricted to Mendocino, Sonoma and possibly San Francisco counties; presumed extirpated in Marin and San Mateo counties.	June-July perennial herb (bulbiferous)	Low: marginally suitable habitat present. Would have been detectable - presumed absent.
<b>Orchidaceae - Orchid Family</b>				
<i>Piperia michaelii</i> Michael's rein orchid	Federal: None State: CEQA CNPS 4.2; YBC	Coastal bluff scrub, closed-cone coniferous forest, cismontane woodland and lower montane coniferous forest. Coastal from San Luis Obispo to Humboldt counties and the San Francisco Bay Area; expected in the Sierra foothills. Found on the Marin Islands.	May-August perennial herb	Low: marginally suitable habitat present. Would have been detectable - presumed absent.
<b>Potamogetonaceae - Pondweed Family</b>				
<i>Potamogeton filiformis</i> slender-leaved pondweed	Federal: None State: CEQA CNPS 2.2	Shallow freshwater marshes and swamps. Recorded from the San Joaquin Valley, central high Sierra Nevada and the San Francisco Bay Area.	May-July perennial herb (rhizomatous)	Not expected: no suitable habitat present.

Family Scientific Name Common Name	Status <sup>1</sup>	Habitat Affinities and Reported Localities in the Project Area	Comments	Potential for Occurrence On Site
<b>Pottiaceae - Moss family</b>				
<i>Triquetrella californica</i>	<b>Federal:</b> None <b>State:</b> CEQA <b>CNPS</b> IB.2	Coastal bluff scrub and coastal scrub. Known from Contra Costa, Mendocino, San Diego, and San Francisco counties and Oregon. Known in California from fewer than ten small coastal occurrences.	N/A moss	Low: marginally suitable habitat present. Would have been detectable - presumed absent.
triquetrella				

<sup>1</sup> Explanation of sensitivity status codes provided in Appendix C.

## Appendix C CNDDDB Report

California Department of Fish and Game  
Natural Diversity Database

Selected Elements by Scientific Name - Portrait

YBI Ramp Improvement Project - Oakland West and 8 Surrounding (San Quentin, Richmond, Briones Valley, San Francisco North, Oakland East, San Francisco South, Hunter's Point, and San Leandro)

Scientific Name/Common Name	Element Code	Federal Status	State Status	GRank	SRank	CDFG or CNPS
1 <i>Accipiter cooperii</i> Cooper's hawk	ABNKC12040			G5	S3	
2 <i>Actinemys marmorata</i> western pond turtle	ARAD02030			G3G4	S3	SC
3 <i>Ambystoma californiense</i> California tiger salamander	AAAAA01180	Threatened		G2G3	S2S3	SC
4 <i>Amsinckia lunaris</i> bent-flowered fiddleneck	PBOR01070			G2	S2.2	1B.2
5 <i>Antrozous pallidus</i> pallid bat	AMACC10010			G5	S3	SC
6 <i>Aquila chrysaetos</i> golden eagle	ABNKC22010			G5	S3	
7 <i>Archipites interruptus</i> Sacramento perch	AFCQB07010			G3	S1	SC
8 <i>Arctostaphylos hookeri</i> ssp. <i>franciscana</i> Franciscan manzanita	PDERI040J3			G3TXC	SX	1A
9 <i>Arctostaphylos hookeri</i> ssp. <i>ravenii</i> Presidio manzanita	PDERI040J2	Endangered	Endangered	G3T1	S1.1	1B.1
10 <i>Arctostaphylos imbricata</i> San Bruno Mountain manzanita	PDERI040L0		Endangered	G1	S1.2	1B.1
11 <i>Arctostaphylos montanaensis</i> Montara manzanita	PDERI042W0			G2	S2.2	1B.2
12 <i>Arctostaphylos pacifica</i> Pacific manzanita	PDERI040Z0		Endangered	G1	S1.1	1B.2
13 <i>Arctostaphylos pallida</i> pallid manzanita	PDERI04110	Threatened	Endangered	G1	S1.2	1B.1
14 <i>Ardea alba</i> great egret	ABNGA04040			G5	S4	
15 <i>Ardea herodias</i> great blue heron	ABNGA04010			G5	S4	
16 <i>Arenaria paludicola</i> marsh sandwort	PDCAR040L0	Endangered	Endangered	G1	S1.1	1B.1
17 <i>Asio flammeus</i> short-eared owl	ABNSB13040			G5	S3	SC
18 <i>Astragalus tener</i> var. <i>tener</i> alkali milk-vetch	PDFAB0F8R1			G1T1	S1.1	1B.2
19 <i>Athene cunicularia</i> burrowing owl	ABNSB10010			G4	S2	SC
20 <i>Atriplex joaquiniana</i> San Joaquin sparscale	PDCHE041F3			G2	S2.1	1B.2
21 <i>Banksia incredula</i> incredible harvestman	ILARA14100			G1	S1	
22 <i>Branta hutchinsii leucopareia</i> cackling (=Aleutian Canada) goose	ABNJB05035	Delisted		G5T4	S2	
23 <i>Caecidotea tomalensis</i> Tomales isopod	ICMAL01220			G2	S2	

Commercial Version - Dated August 02, 2008 - Biogeographic Data Branch  
Report Printed on Wednesday, November 05, 2008

Page 1

Information Expires 02/02/2009



California Department of Fish and Game  
Natural Diversity Database

Selected Elements by Scientific Name - Portal

YBI Ramp Improvement Project - Oakland West and 8 Surrounding (San Quentin, Richmond, Briones Valley, San Francisco North, Oakland East, San Francisco South, Hunter's Point, and San Leandro)

Scientific Name/Common Name	Element Code	Federal Status	State Status	GRank	SRank	CDFG or CNPS
24 <i>California macrophylla</i> round-leaved filaree	PDGER01070			G3	S3.1	1B.1
25 <i>Callophrys mossii bayensis</i> San Bruno elfin butterfly	IILEPE2202	Endangered		G4T1	S1	
26 <i>Calochortus pulchellus</i> Mt. Diablo fairy-lantern	PMLI00160			G2	S2.1	1B.2
27 <i>Calochortus tiburonensis</i> Tiburon maniposa-lily	PMLI001C0	Threatened	Threatened	G1	S1.2	1B.1
28 <i>Calystegia purpurata ssp. saxicola</i> coastal bluff morning-glory	PDCON040D2			G4T2	S2.2	1B.2
29 <i>Carex comosa</i> bristly sedge	PMCY032Y0			G5	S2?	2.1
30 <i>Castilleja affinis ssp. neglecta</i> Tiburon paintbrush	PDSCR0D013	Endangered	Threatened	G4G5T1	S1.2	1B.2
31 <i>Centromadia parryi ssp. congdonii</i> Congdon's tarplant	PDAST4R0P1			G4T3	S3.2	1B.2
32 <i>Charadrius alexandrinus nivosus</i> western snowy plover	ABNNB03031	Threatened		G4T3	S2	SC
33 <i>Chorizanthe cuspidata var. cuspidata</i> San Francisco Bay spineflower	PDPGN040B1			G2T2	S2.2	1B.2
34 <i>Chorizanthe robusta var. robusta</i> robust spineflower	PDPGN040Q2	Endangered		G2T1	S1.1	1B.1
35 <i>Cicindela hirticollis gravida</i> sandy beach tiger beetle	IICOL02101			G5T2	S1	
36 <i>Circus cyaneus</i> northern harrier	ABNKC11010			G5	S3	SC
37 <i>Cirsium andrewsii</i> Franciscan thistle	PDAST2E050			G2	S2.2	1B.2
38 <i>Cirsium occidentale var. compactum</i> compact cobwebby thistle	PDAST2E1Z1			G3G4T2	S2.1	1B.2
39 <i>Clarkia concinna ssp. automisa</i> Santa Clara red ribbons	PDONA050A1			G5?T3	S3.3	4.3
40 <i>Clarkia franciscana</i> Presidio clarkia	PDONA050H0	Endangered	Endangered	G1	S1.1	1B.1
41 <i>Coastal Terrace Prairie</i>	CTT41100CA			G2	S2.1	
42 <i>Collinsia corymbosa</i> round-headed Chinese-houses	PDSCR0H060			G1	S1.2	1B.2
43 <i>Collinsia multicolor</i> San Francisco collinsia	PDSCR0H0B0			G2	S2.2	1B.2
44 <i>Cordylanthus maritimus ssp. palustris</i> Point Reyes bird's-beak	PDSCR0J0C3			G4?T2	S2.2	1B.2
45 <i>Danaus plexippus</i> monarch butterfly	IILEPP2010			G5	S3	
46 <i>Dipodomys heermanni berkeleyensis</i> Berkeley kangaroo rat	AMAFD03061			G3G4T1	S1	

California Department of Fish and Game  
Natural Diversity Database

Selected Elements by Scientific Name - Portrait

YBI Ramp Improvement Project - Oakland West and 8 Surrounding (San Quentin, Richmond, Briones Valley, San Francisco North, Oakland East, San Francisco South, Hunter's Point, and San Leandro)

Scientific Name/Common Name	Element Code	Federal Status	State Status	GRank	SRank	CDFG or CNPS
47 <i>Dirca occidentalis</i> western leatherwood	PDTHY03010			G2G3	S2S3	1B.2
48 <i>Dufourea stagei</i> Stage's dufourine bee	IIHYM22010			G1?	S1?	
49 <i>Egretta thula</i> snowy egret	ABNGA06030			G5	S4	
50 <i>Elanus leucurus</i> white-tailed kite	ABNKC06010			G5	S3	
51 <i>Enhydra lutris nereis</i> southern sea otter	AMAJF09012	Threatened		G4T2	S2	
52 <i>Eriogonum luteolum</i> var. <i>caninum</i> Tiburon buckwheat	PDPGN083S1			G5T3	S3.2	1B.2
53 <i>Eucyclogobius newberryi</i> tidewater goby	AFCQN04010	Endangered		G3	S2S3	SC
54 <i>Euphydryas editha bayensis</i> Bay checkerspot butterfly	IILEPK4055	Threatened		G5T1	S1	
55 <i>Fritillaria illiacea</i> fragrant fritillary	PMLIL0V0C0			G2	S2.2	1B.2
56 <i>Geothlypis trichas sinuosa</i> saltmarsh common yellowthroat	ABPBX1201A			G5T2	S2	SC
57 <i>Gilia capitata</i> ssp. <i>chamissonis</i> blue coast gilia	PDPLM040B3			G5T2	S2.1	1B.1
58 <i>Gilia millefoliata</i> dark-eyed gilia	PDPLM04130			G2	S2.2	1B.2
59 <i>Grindella hirsutula</i> var. <i>maritima</i> San Francisco gumplant	PDAST470D3			G5T2	S2.1	1B.2
60 <i>Haliaeetus leucocephalus</i> bald eagle	ABNKC10010	Delisted	Endangered	G5	S2	
61 <i>Helianthella castanea</i> Diablo helianthella	PDAST4M020			G3	S3.2	1B.2
62 <i>Helminthoglypta nickliniana bridgesi</i> Bridges' coast range shoulderband	IMGASC2362			G2T1	S1	
63 <i>Hesperexax sparsiflora</i> var. <i>brevifolia</i> short-leaved evax	PDASTE5011			G4T2T3	S2S3	1B.2
64 <i>Hesperotriton congestum</i> Marin western flax	PDLIN01060	Threatened	Threatened	G2	S2.1	1B.1
65 <i>Hoita strobilina</i> Loma Prieta hoita	PDFABSZ030			G2	S2.1	1B.1
66 <i>Holocarpha macradenia</i> Santa Cruz tarplant	PDAST4X020	Threatened	Endangered	G1	S1.1	1B.1
67 <i>Horkelia cuneata</i> ssp. <i>sericea</i> Kellogg's horkelia	PDROSOW043			G4T1	S1.1	1B.1
68 <i>Hydroporus leechi</i> Leech's skyline diving beetle	IICOL55040			G1?	S1?	
69 <i>Hydroprogne caspia</i> Casplan tern	ABNNM08020			G5	S4	

Commercial Version -- Dated August 02, 2008 -- Biogeographic Data Branch  
Report Printed on Wednesday, November 05, 2008

Page 3  
Information Expires 02/02/2009

California Department of Fish and Game  
Natural Diversity Database

Selected Elements by Scientific Name - Portrait

YBI Ramp Improvement Project - Oakland West and 8 Surrounding (San Quentin, Richmond, Briones Valley, San Francisco North, Oakland East, San Francisco South, Hunter's Point, and San Leandro)

Scientific Name/Common Name	Element Code	Federal Status	State Status	GRank	SRank	CDFG or CNPS
70 <i>Ischnura gemina</i> San Francisco forktail damselfly	IIDO72010			G2	S2	
71 <i>Lasiorycteris noctivagans</i> silver-haired bat	AMACC02010			G5	S3S4	
72 <i>Lasiurus blossevillei</i> western red bat	AMACC05060			G5	S3?	SC
73 <i>Lasiurus cinereus</i> hoary bat	AMACC05030			G5	S4?	
74 <i>Lasthenia conjungens</i> Contra Costa goldfields	PDAST5L040	Endangered		G1	S1.1	1B.1
75 <i>Lateralus jamalensis coturniculus</i> California black rail	ABNME03041		Threatened	G4T1	S1	
76 <i>Layia camosa</i> beach layia	PDAST5N010	Endangered	Endangered	G2	S2.1	1B.1
77 <i>Leptosiphon rosaceus</i> rose leptosiphon	PDPLM09180			G1	S1.1	1B.1
78 <i>Lessingia germanorum</i> San Francisco lessinga	PDAST5S010	Endangered	Endangered	G1	S1.1	1B.1
79 <i>Lichnanthe ursina</i> bumblebee scarab beetle	IICOL67020			G2	S2	
80 <i>Malacothamnus arcuatus</i> arcuate bush-mallow	PDMAL0Q0E0			G2Q	S2.2	1B.2
81 <i>Masticophis lateralis euryxanthus</i> Alameda whipsnake	ARADB21031	Threatened	Threatened	G4T2	S2	
82 <i>Meconella oregana</i> Oregon meconella	PDPAP0G030			G2G3	S1.1	1B.1
83 <i>Melospiza melodia maxillaris</i> Suisun song sparrow	ABPBXA301K			G5T2	S2	SC
84 <i>Melospiza melodia pusillula</i> Alameda song sparrow	ABPBXA301S			G5T2?	S2?	SC
85 <i>Melospiza melodia samuelis</i> San Pablo song sparrow	ABPBXA301W			G5T2?	S2?	SC
86 <i>Microcina leei</i> Lee's micro-blind harvestman	ILARA47040			G1	S1	
87 <i>Microcina tiburona</i> Tiburon micro-blind harvestman	ILARA47060			G1	S1	
88 <i>Microseris paludosa</i> marsh microseris	PDAST6E0D0			G2	S2.2	1B.2
89 <i>Microtus californicus sanpabloensis</i> San Pablo vole	AMAFF11034			G5T1T2	S1S2	SC
90 <i>Monardella villosa ssp. globosa</i> robust monardella	PDLAM180P7			G5T2	S2.2	1B.2
91 <i>Northern Coastal Salt Marsh</i>	CTT52110CA			G3	S3.2	
92 <i>Northern Maritime Chaparral</i>	CTT37C10CA			G1	S1.2	



## California Department of Fish and Game

## Natural Diversity Database

## Selected Elements by Scientific Name - Portrait

YBI Ramp Improvement Project - Oakland West and 8 Surrounding (San Quentin, Richmond, Briones Valley, San Francisco North, Oakland East, San Francisco South, Hunter's Point, and San Leandro)

Scientific Name/Common Name	Element Code	Federal Status	State Status	GRank	SRank	CDFG or CNPS
93 <i>Nycticorax nycticorax</i> black-crowned night heron	ABNGA11010			G5	S3	
94 <i>Nyctinomops macrotis</i> big free-tailed bat	AMACD04020			G5	S2	SC
95 <i>Pentachaeta bellidiflora</i> white-rayed pentachaeta	PDAST6X030	Endangered	Endangered	G1	S1.1	1B.1
96 <i>Phalacrocorax auritus</i> double-crested cormorant	ABNFD01020			G5	S3	
97 <i>Plagiobothrys chorisianus</i> var. <i>chorisianus</i> Choris' popcorn-flower	PDBOR0V061			G3T2Q	S2.2	1B.2
98 <i>Plagiobothrys diffusus</i> San Francisco popcorn-flower	PDBOR0V080		Endangered	G1Q	S1.1	1B.1
99 <i>Plagiobothrys glaber</i> hairless popcorn-flower	PDBOR0V080			GH	SH	1A
100 <i>Ptebejus icarioides missionensis</i> Mission blue butterfly	IILEPG801A	Endangered		G5T1	S1	
101 <i>Potamogeton filiformis</i> slender-leaved pondweed	PMPO703090			G5	S1S2	2.2
102 <i>Rallus longirostris obsoletus</i> California clapper rail	ABNME05016	Endangered	Endangered	G5T1	S1	
103 <i>Rana boylei</i> foothill yellow-legged frog	AAABH01050			G3	S2S3	SC
104 <i>Rana draytonii</i> California red-legged frog	AAABH01022	Threatened		G4T2T3	S2S3	SC
105 <i>Reithrodontomys raviventris</i> salt-marsh harvest mouse	AMAFF02040	Endangered	Endangered	G1G2	S1S2	
106 <i>Riparia riparia</i> bank swallow	ABPAU06010		Threatened	G5	S2S3	
107 <i>Rynchops niger</i> black skimmer	ABNNM14010			G5	S1S3	SC
108 <i>Sanicula maritima</i> adobe sanicle	PDAPH120D0		Rare	G2	S2.2	1B.1
109 <i>Scapanus latimanus insularis</i> Angel Island mole	AMABB02032			G5T1	S1	
110 <i>Scapanus latimanus parvus</i> Alameda Island mole	AMABB02031			G5T1Q	S1	SC
111 <i>Serpentine Bunchgrass</i>	CTT42130CA			G2	S2.2	
112 <i>Silene verecunda</i> ssp. <i>verecunda</i> San Francisco campion	PDCAR0U213			G5T2	S2.2	1B.2
113 <i>Sorex vagrans halicoetes</i> salt-marsh wandering shrew	AMABA01071			G5T1	S1	SC
114 <i>Speyeria callippe callippe</i> callippe silverspot butterfly	IILEPJ6091	Endangered		G5T1	S1	
115 <i>Stebbinsoseris decipiens</i> Santa Cruz microseris	PDAST6E050			G2	S2.2	1B.2

## California Department of Fish and Game

## Natural Diversity Database

## Selected Elements by Scientific Name - Portrait

YBI Ramp Improvement Project - Oakland West and 8 Surrounding (San Quentin, Richmond, Briones Valley, San Francisco North, Oakland East, San Francisco South, Hunter's Point, and San Leandro)

Scientific Name/Common Name	Element Code	Federal Status	State Status	GRank	SRank	CDFG or CNPS
116 <i>Sternula antillarum browni</i> California least tern	ABNNM08103	Endangered	Endangered	G4T2T3Q	S2S3	
117 <i>Streptanthus albidus ssp. peramoenus</i> most beautiful jewel-flower	PDBRA2G012			G2T2	S2.2	1B.2
118 <i>Streptanthus niger</i> Tiburon jewel-flower	PDBRA2G0T0	Endangered	Endangered	G1	S1.1	1B.1
119 <i>Suaeda californica</i> California seablite	PDCHE0P020	Endangered		G1	S1.1	1B.1
120 <i>Symphytotrichum lentum</i> Suisun Marsh aster	PDASTE8470			G2	S2.2	1B.2
121 <i>Taxidea taxus</i> American badger	AMAJF04010			G5	S4	SC
122 <i>Thamnophis sirtalis tetrataenia</i> San Francisco garter snake	ARAD83613B	Endangered	Endangered	G5T2	S2	
123 <i>Trachusa gummiifera</i> A leaf-cutter bee	IIHYM80010			G1	S1	
124 <i>Trifolium amoenum</i> two-fork clover	PDFAB40040	Endangered		G1	S1.1	1B.1
125 <i>Trifolium depauperatum var. hydrophilum</i> saline clover	PDFAB400R5			G5T2?	S2.2?	1B.2
126 <i>Triphysaria floribunda</i> San Francisco owl's clover	PDSCR2T010			G2	S2.2	1B.2
127 <i>Triquetrella californica</i> coastal triquetrella	NBMUS7S010			G1	S1.2	1B.2
128 <i>Tryonia imitator</i> mimic tryonia (=California brackishwater snail)	IMGASJ7040			G2G3	S2S3	
129 <i>Valley Needlegrass Grassland</i>	CTT42110CA			G1	S3.1	
130 <i>Vespericola marinensis</i> Mann hesperian	IMGASA4140			G2G3	S2S3	
131 <i>Xanthocephalus xanthocephalus</i> yellow-headed blackbird	ABPBXB3010			G5	S3S4	SC
132 <i>Zapus trinotatus orarius</i> Point Reyes jumping mouse	AMAFH01031			G5T1T3Q	S1S3	SC

# Appendix D USFWS List

## U.S. Fish & Wildlife Service Sacramento Fish & Wildlife Office

Federal Endangered and Threatened Species that Occur in  
or may be Affected by Projects in the Counties and/or  
U.S.G.S. 7 1/2 Minute Quads you requested

Document Number: 100624034334

Database Last Updated: April 29, 2010

### Quad Lists

#### Listed Species

##### Invertebrates

- Branchinecta lynchi*  
vernal pool fairy shrimp (T)
- Euphydryas editha bayensis*  
Critical habitat, bay checkerspot butterfly (X)
- Haliotes cracherodii*  
black abalone (E) (NMFS)
- Haliotes sorenseni*  
white abalone (E) (NMFS)
- Icaricia icarioides missionensis*  
mission blue butterfly (E)
- Speyeria callippe callippe*  
callippe silverspot butterfly (E)
- Speyeria zerene myrtleae*  
Myrtle's silverspot butterfly (E)

##### Fish

- Acipenser medirostris*  
green sturgeon (T) (NMFS)
- Eucyclogobius newberryi*  
tidewater goby (E)
- Hypomesus transpacificus*  
Critical habitat, delta smelt (X)  
delta smelt (T)
- Oncorhynchus kisutch*  
coho salmon - central CA coast (E) (NMFS)  
Critical habitat, coho salmon - central CA coast (X) (NMFS)
- Oncorhynchus mykiss*  
Central California Coastal steelhead (T) (NMFS)  
Central Valley steelhead (T) (NMFS)  
Critical habitat, Central California coastal steelhead (X) (NMFS)  
Critical habitat, Central Valley steelhead (X) (NMFS)
- Oncorhynchus tshawytscha*  
Central Valley spring-run chinook salmon (T) (NMFS)  
Critical habitat, winter-run chinook salmon (X) (NMFS)  
winter-run chinook salmon, Sacramento River (E) (NMFS)

##### Amphibians

- Ambystoma californiense*  
California tiger salamander, central population (T)



- Rana draytonii*  
California red-legged frog (T)  
Critical habitat, California red-legged frog (X)

## Reptiles

- Caretta caretta*  
loggerhead turtle (T) (NMFS)  
*Chelonia mydas* (incl. *agassizi*)  
green turtle (T) (NMFS)  
*Dermochelys coriacea*  
leatherback turtle (E) (NMFS)  
*Lepidochelys olivacea*  
olive (=Pacific) ridley sea turtle (T) (NMFS)  
*Masticophis lateralis euryxanthus*  
Alameda whipsnake [=striped racer] (T)  
Critical habitat, Alameda whipsnake (X)  
*Thamnophis sirtalis tetrataenia*  
San Francisco garter snake (E)

## Birds

- Brachyramphus marmoratus*  
marbled murrelet (T)  
*Charadrius alexandrinus nivosus*  
western snowy plover (T)  
*Diomedea albatrus*  
short-tailed albatross (E)  
*Pelecanus occidentalis californicus*  
California brown pelican (E)  
*Rallus longirostris obsoletus*  
California clapper rail (E)  
*Sternula antillarum* (=Sterna, =albifrons) browni  
California least tern (E)

## Mammals

- Arctocephalus townsendi*  
Guadalupe fur seal (T) (NMFS)  
*Balaenoptera borealis*  
sei whale (E) (NMFS)  
*Balaenoptera musculus*  
blue whale (E) (NMFS)  
*Balaenoptera physalus*  
finback (=fin) whale (E) (NMFS)  
*Enhydra lutris nereis*  
southern sea otter (T)  
*Eubalaena (=Balaena) glacialis*  
right whale (E) (NMFS)  
*Eumetopias jubatus*  
Critical Habitat, Steller (=northern) sea-lion (X) (NMFS)  
Steller (=northern) sea-lion (T) (NMFS)  
*Physeter catodon* (=macrocephalus)  
sperm whale (E) (NMFS)  
*Reithrodontomys raviventris*  
salt marsh harvest mouse (E)

## Plants

*Arctostaphylos hookeri* ssp. *ravenii*  
 Presidio (=Raven's) manzanita (E)

*Arctostaphylos pallida*  
 pallid manzanita (=Alameda or Oakland Hills manzanita) (T)

*Calochortus tiburonensis*  
 Tiburon mariposa lily (T)

*Castilleja affinis* ssp. *neglecta*  
 Tiburon paintbrush (E)

*Clarkia franciscana*  
 Presidio clarkia (E)

*Hesperolinon congestum*  
 Marin dwarf-flax (=western flax) (T)

*Holocarpha macradenia*  
 Critical habitat, Santa Cruz tarplant (X)  
 Santa Cruz tarplant (T)

*Lasthenia conjugens*  
 Contra Costa goldfields (E)

*Lessingia germanorum*  
 San Francisco lessingia (E)

*Streptanthus niger*  
 Tiburon jewelflower (E)

*Suaeda californica*  
 California sea blite (E)

#### Proposed Species

##### Amphibians

*Rana draytonii*  
 Critical habitat, California red-legged frog (PX)

#### Quads Containing Listed, Proposed or Candidate Species:

SAN LEANDRO (447B)  
 HUNTERS POINT (448A)  
 SAN FRANCISCO SOUTH (448B)  
 BRIONES VALLEY (465B)  
 OAKLAND EAST (465C)  
 RICHMOND (466A)  
 SAN QUENTIN (466B)  
 SAN FRANCISCO NORTH (466C)  
 OAKLAND WEST (466D)

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### County Lists

#### Listed Species

##### Invertebrates

*Haliotes cracherodii*  
 black abalone (E) (NMFS)

*Haliotes sorenseni*  
 white abalone (E) (NMFS)

*Icaricia icarioides missionensis*  
 mission blue butterfly (E)

*Incisalia mossii bayensis*  
San Bruno elfin butterfly (E)

#### Fish

*Acipenser medirostris*  
green sturgeon (T) (NMFS)

*Eucyclogobius newberryi*  
tidewater goby (E)

*Oncorhynchus kisutch*  
coho salmon - central CA coast (E) (NMFS)

*Oncorhynchus mykiss*  
Central California Coastal steelhead (T) (NMFS)  
Critical habitat, Central California coastal steelhead (X) (NMFS)  
Critical habitat, Central Valley steelhead (X) (NMFS)

*Oncorhynchus tshawytscha*  
Critical habitat, winter-run chinook salmon (X) (NMFS)  
winter-run chinook salmon, Sacramento River (E) (NMFS)

#### Amphibians

*Rana draytonii*  
California red-legged frog (T)

#### Reptiles

*Caretta caretta*  
loggerhead turtle (T) (NMFS)

*Chelonia mydas* (incl. *agassizi*)  
green turtle (T) (NMFS)

*Dermochelys coriacea*  
leatherback turtle (E) (NMFS)

*Lepidochelys olivacea*  
olive (=Pacific) ridley sea turtle (T) (NMFS)

#### Birds

*Charadrius alexandrinus nivosus*  
western snowy plover (T)

*Diomedea albatrus*  
short-tailed albatross (E)

*Pelecanus occidentalis californicus*  
California brown pelican (E)



*Rallus longirostris obsoletus*  
California clapper rail (E)

#### Mammals

*Arctocephalus townsendi*  
Guadalupe fur seal (T) (NMFS)

*Balaenoptera borealis*  
sei whale (E) (NMFS)

*Balaenoptera musculus*  
blue whale (E) (NMFS)

*Balaenoptera physalus*  
finback (=fin) whale (E) (NMFS)

*Eubalaena (=Balaena) glacialis*  
right whale (E) (NMFS)

*Eumetopias jubatus*  
Critical Habitat, Steller (=northern) sea-lion (X) (NMFS)  
Steller (=northern) sea-lion (T) (NMFS)

*Megaptera novaeangliae*  
humpback whale (E) (NMFS)

*Physeter catodon (=macrocephalus)*  
sperm whale (E) (NMFS)

*Reithrodontomys raviventris*  
salt marsh harvest mouse (E)

#### Plants

*Arctostaphylos hookeri ssp. ravenii*  
Presidio (=Raven's) manzanita (E)

*Clarkia franciscana*  
Presidio clarkia (E)

*Hesperolinon congestum*  
Marin dwarf-flax (=western flax) (T)

*Lessingia germanorum*  
San Francisco lessingia (E)

#### Key:

(E) *Endangered* - Listed as being in danger of extinction.

(T) *Threatened* - Listed as likely to become endangered within the foreseeable future.

(P) *Proposed* - Officially proposed in the Federal Register for listing as endangered or threatened.

(NMFS) Species under the Jurisdiction of the National Oceanic & Atmospheric Administration Fisheries Service.

Consult with them directly about these species.  
*Critical Habitat* - Area essential to the conservation of a species.  
 (PX) *Proposed Critical Habitat* - The species is already listed. Critical habitat is being proposed for it.  
 (C) *Candidate* - Candidate to become a proposed species.  
 (V) Vacated by a court order. Not currently in effect. Being reviewed by the Service.  
 (X) *Critical Habitat* designated for this species

## Important Information About Your Species List

### How We Make Species Lists

We store information about endangered and threatened species lists by U.S. Geological Survey 7½ minute quads. The United States is divided into these quads, which are about the size of San Francisco.

The animals on your species list are ones that occur within, **or may be affected by** projects within, the quads covered by the list.

- Fish and other aquatic species appear on your list if they are in the same watershed as your quad or if water use in your quad might affect them.
- Amphibians will be on the list for a quad or county if pesticides applied in that area may be carried to their habitat by air currents.
- Birds are shown regardless of whether they are resident or migratory. Relevant birds on the county list should be considered regardless of whether they appear on a quad list.

### Plants

Any plants on your list are ones that have actually been observed in the area covered by the list. Plants may exist in an area without ever having been detected there. You can find out what's in the surrounding quads through the California Native Plant Society's online [Inventory of Rare and Endangered Plants](#).

### Surveying

Some of the species on your list may not be affected by your project. A trained biologist and/or botanist, familiar with the habitat requirements of the species on your list, should determine whether they or habitats suitable for them may be affected by your project. We recommend that your surveys include any proposed and candidate species on your list. See our [Protocol](#) and [Recovery Permits](#) pages.

For plant surveys, we recommend using the [Guidelines for Conducting and Reporting Botanical Inventories](#). The results of your surveys should be published in any environmental documents prepared for your project.

### Your Responsibilities Under the Endangered Species Act

All animals identified as listed above are fully protected under the Endangered Species Act of 1973, as amended. Section 9 of the Act and its implementing regulations prohibit the take of a federally listed wildlife species. Take is defined by the Act as "to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect" any such animal.

Take may include significant habitat modification or degradation where it actually kills or injures wildlife by significantly impairing essential behavioral patterns, including breeding, feeding, or shelter (50 CFR §17.3).

Take incidental to an otherwise lawful activity may be authorized by one of two procedures:

- If a Federal agency is involved with the permitting, funding, or carrying out of a project that

may result in take, then that agency must engage in a formal consultation with the Service.

During formal consultation, the Federal agency, the applicant and the Service work together to avoid or minimize the impact on listed species and their habitat. Such consultation would result in a biological opinion by the Service addressing the anticipated effect of the project on listed and proposed species. The opinion may authorize a limited level of incidental take.

- If no Federal agency is involved with the project, and federally listed species may be taken as part of the project, then you, the applicant, should apply for an incidental take permit. The Service may issue such a permit if you submit a satisfactory conservation plan for the species that would be affected by your project.

Should your survey determine that federally listed or proposed species occur in the area and are likely to be affected by the project, we recommend that you work with this office and the California Department of Fish and Game to develop a plan that minimizes the project's direct and indirect impacts to listed species and compensates for project-related loss of habitat. You should include the plan in any environmental documents you file.

### Critical Habitat

When a species is listed as endangered or threatened, areas of habitat considered essential to its conservation may be designated as critical habitat. These areas may require special management considerations or protection. They provide needed space for growth and normal behavior; food, water, air, light, other nutritional or physiological requirements; cover or shelter; and sites for breeding, reproduction, rearing of offspring, germination or seed dispersal.

Although critical habitat may be designated on private or State lands, activities on these lands are not restricted unless there is Federal involvement in the activities or direct harm to listed wildlife.

If any species has proposed or designated critical habitat within a quad, there will be a separate line for this on the species list. Boundary descriptions of the critical habitat may be found in the Federal Register. The information is also reprinted in the Code of Federal Regulations (50 CFR 17.95). See our Map Room page.

### Candidate Species

We recommend that you address impacts to candidate species. We put plants and animals on our candidate list when we have enough scientific information to eventually propose them for listing as threatened or endangered. By considering these species early in your planning process you may be able to avoid the problems that could develop if one of these candidates was listed before the end of your project.

### Species of Concern

The Sacramento Fish & Wildlife Office no longer maintains a list of species of concern. However, various other agencies and organizations maintain lists of at-risk species. These lists provide essential information for land management planning and conservation efforts. [More info](#)

### Wetlands

If your project will impact wetlands, riparian habitat, or other jurisdictional waters as defined by section 404 of the Clean Water Act and/or section 10 of the Rivers and Harbors Act, you will need to obtain a permit from the U.S. Army Corps of Engineers. Impacts to wetland habitats require site specific mitigation and monitoring. For questions regarding wetlands, please contact Mark Littlefield of this office at (916) 414-6580.

### Updates

Our database is constantly updated as species are proposed, listed and delisted. If you



address proposed and candidate species in your planning, this should not be a problem. However, we recommend that you get an updated list every 90 days. That would be September 22, 2010.

## **APPENDIX O**

### **PHASE I ISA**





**PRELIMINARY PHASE I ISA REPORT  
Yerba Buena Island Ramps Improvement Project  
Yerba Buena Island  
San Francisco County, California**

AECOM Project Number: 60046943.3060

*Prepared for:*

Mr. Eric Cordoba, Project Manager  
And Mr. Bob Zandipour, Project Engineer  
State of California Department of Transportation  
And  
San Francisco County Transportation Authority  
100 Van Ness Avenue  
San Francisco, California 92630

*Prepared by:*

AECOM Technology Corporation  
999 Town & Country Road, Fourth Floor  
Orange, California 92868  
(714) 835-4447  
fax (714) 953-6989



June 8, 2010

## TABLE OF CONTENTS

SUMMARY OF CONCLUSIONS .....	1
1.0 INTRODUCTION .....	3
2.0 PROJECT DESCRIPTION AND HISTORICAL INFORMATION .....	4
2.1 Project Description .....	4
2.2 Geological Information .....	5
2.3 Historical Aerial Photograph Review .....	6
2.4 Other Historical Information Sources .....	6
3.0 PHYSICAL SITE INSPECTION .....	7
3.1 Site Visit .....	7
3.2 Aerial Lead Deposition .....	8
3.3 Asbestos-Containing Materials (ACMs) and Lead-Based Paint .....	9
4.0 REGULATORY RECORDS REVIEW .....	9
5.0 CONCLUSIONS AND RECOMMENDATIONS .....	14
6.0 LIMITATIONS .....	14

APPENDIX A:	INITIAL SITE ASSESSMENT CHECKLIST
APPENDIX B:	SITE VICINITY MAP AND PROJECT PLANS
APPENDIX C:	REGULATORY RECORDS DOCUMENTATION
APPENDIX D:	HISTORICAL RESEARCH DOCUMENTATION
	<i>HISTORICAL AERIAL PHOTOGRAPHS</i>
	<i>SANBORN FIRE INSURANCE MAP SEARCH</i>
	<i>CITY DIRECTORY ABSTRACT</i>
	<i>HISTORICAL TOPOGRAPHIC MAPS</i>
APPENDIX E:	RESUME OF PREPARER

## **Preliminary Phase I ISA Report**

### **SUMMARY OF CONCLUSIONS**

Name of Project:	Yerba Buena Island Ramps Improvement Project
Location:	Yerba Buena Island, San Francisco County, California
Consultant Name:	AECOM Technology Corporation
Consultant Project Number:	60046943.3060
Environmental Professional:	Robert Olsen, P.G., R.E.A.II

#### **I. Property Use**

**Current Use** – The project site consists of right-of-way currently occupied by Interstate 80 (I-80) and westbound on-ramps/offramps that provide access to Yerba Buena Island, and via connecting roads to Treasure Island. Included within the disturbance limits of the two project alternatives is land currently occupied by the U.S. Coast Guard and U.S. Navy, as well as Caltrans right-of-way and buildings leased to Caltrans.

#### **Previous Usage Chronology**

On 6 November 1850, Yerba Buena Island (then called Goat Island) was set aside for public purposes. An Executive Order, dated 1 July 1864, set the property aside for military purposes. In 1896, 99.09 acres of hard land were acquired by the Department of the Navy to establish a naval training station. In 1887, 172.20 acres of tide and submerged land were also acquired by the Navy. Between the years of 1938 and 1966, 89.37 additional acres were acquired by the Navy. In 1966, 2.71 acres were transferred from the Navy to the Coast Guard for use as a Coast Guard station. In 1974, an additional 8.207 acres were transferred to the Coast Guard, for a total of 10.917 acres of land disposed.

The San Francisco – Oakland Bay Bridge (SFOBB) was completed in 1936. Yerba Buena Island is located at the approximate midpoint of the bridge and is a key component in bridge structure and maintenance; Caltrans maintenance operations are run from buildings on the island that are leased from the Navy. Currently, a seismic upgrade project on the SFOBB is ongoing, and a new East Span that will connect YBI to the Oakland side of San Francisco Bay is under construction. When the new East Span is completed, the old East Span will be demolished.



## II. Investigations

Scope of Work: This assessment was prepared to conform to the Caltrans Guidance for the preparation of the Initial Site Assessment checklist (Project Development Procedures Manual, 07/01/1999, pp. DD-3 to DD-6).

## III. Findings

- Historical Recognized Environmental Conditions: A Leaking Underground Storage Tank (LUST) case was formerly associated with the removed UST No. 270 (Installation Restoration Site 270) at Building 270 at the Coast Guard facility in the southeast part of the project site. This site received regulatory closure from the Regional Water Quality Control Board in 2004.
- Recognized Environmental Conditions: There are three Installation Restoration (IR) sites underlying parts of the Proposed Project site. IR Site 8, north of Interstate 80, is a former sludge spreading area where soil has been found to be impacted by heavy metals, semivolatile organic compounds, petroleum hydrocarbons and pesticides. IR Site 11, south of Interstate 80, is a former landfill where petroleum hydrocarbons, heavy metals, volatile and semivolatile organic compounds and other substances have been found in soil and groundwater. IR Site 29 includes contaminated soil associated with pilings installed for the Bay Bridge. A Site Management Plan is in effect for all three of these sites, and the Navy is preparing a Remedial Investigation report.

## IV. Opinions and Recommendations

Both Project Alternatives cross areas of known contamination that are in the IR Program. Once a preferred alternative is selected, additional characterization of the extent of contamination will enable plans for waste minimization, worker safety and project-specific handling measures to be developed.

## **1.0 INTRODUCTION**

This Phase I Initial Site Assessment (ISA) was performed in support of the Draft Environmental Impact Report (DEIR) for the Yerba Buena Island Ramps Improvement project on Yerba Buena Island, San Francisco County, California. The project vicinity map and project drawings are presented in Appendix B.

The purpose of this investigation was to identify and evaluate potential hazardous waste sites and update the evaluation of environmental factors that may have impacted the soil and groundwater in the project vicinity due to past and present industrial or commercial activities. This report was prepared by AECOM Transportation, a division of AECOM Technology Corporation, Inc.

Activities associated with the preparation of the ISA included the following:

- Site reconnaissance
- Review of project documents (DEIR)
- Review of historical aerial photographs, city directories, Sanborn maps and historical topographic maps
- Review of regulatory database records for listed sites of potential concern
- Preparation of this summary report, including the ISA Checklist (see Appendix A)

The following sections present the information developed and the findings of the Phase I Initial Site Assessment:

- Section 2.0 Project Description and Historical Information
- Section 3.0 Site Reconnaissance
- Section 4.0 Regulatory Database Search
- Section 5.0 Conclusions and Recommendations
- Section 6.0 Limitations



## **2.0 PROJECT DESCRIPTION AND HISTORICAL INFORMATION**

### **2.1 Project Description**

Yerba Buena Island (YBI) is located in San Francisco Bay, approximately halfway between Oakland and San Francisco, and is accessible by vehicles only via the San Francisco-Oakland Bay Bridge (SFOBB), which is part of Interstate 80 (I-80). The SFOBB is a critical link in the interstate network, providing access between San Francisco and the East Bay. YBI and the SFOBB also provide access to Treasure Island (TI), which lies to the north of YBI. YBI and TI are accessed by on-and off-ramps located on the upper and lower decks of the SFOBB. The SFOBB and the associated on- and off-ramps provide the only land access to the active US Coast Guard facilities located on the southern side of YBI.

The proposed project would replace the existing westbound on-ramp and westbound off-ramp located on the eastern side of YBI with a new westbound on-ramp and a new westbound off-ramp in order to improve the functional roles of the current ramps. Build alternatives have been proposed to address the geometric and operational deficiencies of the existing on- and off-ramps and their effects on the SFOBB (I-80) mainline without degrading the mainline operation as compared to the No Action Alternative. This YBI Ramps Improvement Project is separate from and independent of the SFOBB East Span Seismic Safety Project (ESSSP), which is currently under construction. The proposed new ramps would improve operations of the ramps and provide connections between YBI and the transition structure of the new SFOBB. The proposed project is located between Post Mile (PM) 7.6 and PM 8.1, starting at the east portal of the YBI tunnel and ending before the SFOBB Transition Structure.

The purpose of the project is to address the deficiencies of the existing ramps, to the extent physically and economically feasible; improve traffic operations to and from the SFOBB; and improve traffic safety by increasing deceleration length for the westbound off-ramps and increasing merging distance for westbound on-ramps on the east side of YBI. The YBI ramps currently do not meet Caltrans geometric standards. They have not been significantly updated since the 1960s and have an above average accident rate. These conditions, combined with their nonstandard entrances and exits, create traffic operational constraints. In addition, the deceleration length of the off-ramps and the merging distance for the on-ramps are insufficient and not up to current standards. The limited merging and deceleration distances make it challenging for vehicles to enter and exit traffic flows on the SFOBB. The ramps have been designed to accommodate future traffic operations for the 20-year design horizon as required by Caltrans standards.



## **2.2 Geological Information**

The Site Vicinity Map (Appendix B) depicts the geographic location and topographic characteristics of the subject site. Plans of the proposed project alternatives and the locations of the areas of environmental concern (Installation Restoration sites) are also included in Appendix B. Historical aerial photographs, as available, are included in Appendix D.

Information on the surface topography and soil classification of the Property was obtained from the Geology section of the DEIR and from the U. S. Geological Survey 7.5-minute topographic map (San Francisco, CA), and from the USDA Natural Resources Conservation Service (formerly Soil Conservation Service) STATSGO and/or SSURGO databases.

The project site is located along a low ridgeline that projects eastward from the higher, central portions of Yerba Buena Island. The elevation varies from sea level to approximately 50 feet. Soils underlying this part of Yerba Buena Island are classified as Urban land (soils that have been so disturbed by human activities that no classification is possible; classified as having very slow infiltration rates in this area as shown in the EDR Geoscheck report in Appendix C); orthents (soils with no soil horizon development due to steep slopes and rapid erosion) and Candlestick fine sandy loam (slow infiltration rates). The soils are developed on shallow bedrock of the Franciscan group, which consists largely of shaly sandstone. Although serpentinite bodies are common in the Franciscan in other areas, none were noted to occur on Yerba Buena Island in the DEIR or on a geologic map of the Island (Graymer, *Geologic Map and Map Database of the Oakland Metropolitan Area, Alameda, Contra Costa, and San Francisco Counties, California*, U.S. Geological Survey Miscellaneous Field Studies MF 2342, 2000). Serpentinite, where exposed, is a significant source of naturally-occurring asbestos.

The depth to ground water in this area, based on previous subsurface investigations conducted under the Installation Restoration (IR) program, varies from 2.1 to 18.5 meters (6 to 55 feet). Based on surface topography, ground water flow in the area would tend to the northeast and southeast, toward San Francisco Bay.

### **2.3 Historical Aerial Photograph Review**

AECOM reviewed aerial photographs provided by EDR. The photographs are reproduced in Appendix D. The following table summarizes the information obtained from the aerial photographs.

<b>Date</b>	<b>Scale</b>	<b>Subject Site</b>	<b>Off-Site</b>
1946	1" = 655'	Military installation; barracks and offices north of Bay Bridge, isolated buildings and dock south of bridge	Roads and military installations in west part of island generally as presently existing; water tank visible in west-central part of island
1956	1" = 655'	As above	As above
1965	1" = 333'	Barracks buildings removed from north part of site; pier removed from south part of site	As above
1975	1" = 550'	Poor quality photo, no evident changes	Same
1982	1" = 690'	Fair quality photo; increase in structures south of I-80	Same
1993	1" = 666'	Area north of I-80 in project area is generally vacant, possibly a few small structures remaining; area to south of I-80 contains several buildings as presently existing	Generally as presently existing
1998	1" = 666'	As above	As above
2005	1" = 604'	Several new small buildings in area northwest of curve in I-80; area south of I-80 as presently existing	As presently existing

### **2.4 Other Historical Information Sources**

AECOM found historical sources from 1896 to the present, as follows. The regulatory database search and historical information searches were centered on the intersection of Gate Road and 4<sup>th</sup> Street since the project site does not have a specific street address and hence complete information from the various historical information sources would not have been returned.

*Business and Street Directories:* A City Directory Abstract covering the period from 1910 to the present was prepared by EDR. The only listings that were returned were for 301 Macalla Court, which is a base housing facility that is west of the study area. Listings for individuals (presumably military personnel) were returned for 1985, 1990 and 2006.

*Fire Insurance Maps:* EDR-Sanborn, which has the largest collection of historical Sanborn maps in the nation, had no coverage of the area of the Property. Sanborn maps are not compiled for military bases.



## YERBA BUENA ISLAND RAMPS IMPROVEMENT PROJECT

Yerba Buena Island, San Francisco County, California

*Historical Topographic Maps:* Historical topographic maps as shown below were provided by EDR. The maps are presented in Appendix D.

Date	Name	Scale	Description (Site)
1895	San Francisco	15'	YBI labeled "Goat Island", "Light" at southeast point: several structures, probably military, in northeast part of island: Oakland Mole runs from Gibson Point west-northwest approximately two-thirds of the distance to the island. Treasure Island not present.
1915	San Francisco	15'	"Yerba Buena Island" now indicated: more structures visible; San Francisco-Oakland Terminal Key Route Pier indicated north of Oakland Mole
1948	San Francisco	15'	San Francisco-Oakland Bay Bridge visible crossing YBI and with tunnel; Treasure Island now present: Oakland Mole area to east has been filled in and extended toward YBI
1949	Oakland West	7.5'	YBI indicated as "Naval"; larger naval buildings indicated in east part of YBI: Treasure Island indicated as Naval Reservation
1959	Oakland West	7.5'	Coast Guard Reservation indicated in southeast part of YBI: Bay Bridge now indicated as double deck
1968	Oakland West	7.5'	Generally as above: several buildings in project area no longer present: Rapid Transit Trans-Bay Tube under construction south of YBI
1973	Oakland West	7.5'	As above, Rapid Transit Trans-Bay Tube now operational
1980	Oakland West	7.5'	As above

### 3.0 PHYSICAL SITE INSPECTION

On June 2, 2010, Robert Olsen of AECOM conducted an environmental reconnaissance of the subject site to find if current usage or activities on the subject site have created, or have the potential to create, an environmental impairment to the site. The results of this assessment are presented below. The site reconnaissance was limited in nature since the project site includes restricted military facilities, public right-of-way (Interstate 80) and areas adjacent to I-80 currently under construction for the seismic retrofit project on the Bay Bridge.

#### 3.1 Site Visit

Usage of the land areas adjoining the project site includes U.S. Navy and U.S. Coast Guard facilities, and individual buildings leased to Caltrans. Development in this area of Yerba Buena Island consists generally of relatively isolated facilities such as barracks, shops, offices, and support facilities, connected by asphalt-paved roads and separated by areas of brush and forest.

The project site (i.e. the area of the two Proposed Project alternatives) extends along Interstate 80 from the Yerba Buena Island Tunnel on the west through the SFOBB East Span construction zone on the east. At the time of the site reconnaissance this area was



## **YERBA BUENA ISLAND RAMPS IMPROVEMENT PROJECT**

*Yerba Buena Island, San Francisco County, California*

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under construction as part of a seismic retrofit of the SFOBB; the new SFOBB East Span had advanced to approximately 200 feet from the construction zone as well.

The area of the Proposed Project, i.e. the east end of Yerba Buena Island, has been extensively studied under the U.S. Navy's Installation Restoration program, and several areas of known environmental impact are known. Four of these areas are within the footprint of the Proposed Project. These areas are as follows:

IR Site 8: Former U.S. Army Point Sludge Disposal Area (pesticides, heavy metals including beryllium and lead)

IR Site 11: Former U.S. Army and U.S. Navy Landfill (acetone, benzene, polynuclear aromatic hydrocarbons, phenols, pesticides, diesel)

IR Site 29: East Side Contaminated Bridge Soils (lead, petroleum hydrocarbons)

IR Site 270: Former U.S. Navy Underground Storage Tank #270 (diesel fuel)

Based on information Hazardous Waste/Materials section (3.13) of the DEIR, which is based primarily on the Hazardous Waste Assessment conducted for the SFOBB East Span Seismic Safety Project (ESSSP) in 1998, delineation of the extent of contamination of each of the IR sites has been completed. IR Site 270 has received a No Further Action (closure) letter from the Regional Water Quality Control Board and the tank has been removed. IR sites 8, 11 and 29 have been conveyed to Caltrans, but the Navy is preparing a Remedial Investigation for them while also entering into discussions with Caltrans regarding site closout.

### **3.2 Aerial Lead Deposition**

Interstate 80 is a component of the interstate highway system and has existed in its present form in this area since construction of the Bay Bridge in 1936. Due to this vehicular activity the soils along Interstate 80 are likely contaminated with aurally-deposited lead (ADL) from exhaust from vehicles burning leaded gasoline. The lead levels in surface soils along highways can reach concentrations in excess of the hazardous waste threshold, requiring disposal at either a Class I landfill or on-site stabilization. According to the DEIR, the elevated levels of lead in the soil in IR Area 27 (East Side Contaminated Bridge Soils) have been ascribed to aurally-deposited lead as well as bridge-related maintenance activities. Special health and safety procedures will be needed for workers near potentially lead-contaminated areas. A work plan for investigation of the ADL should be prepared and implemented during the design phase of the project.

## YERBA BUENA ISLAND RAMPS IMPROVEMENT PROJECT

Yerba Buena Island, San Francisco County, California

### 3.3 Asbestos-Containing Materials (ACMs) and Lead-Based Paint

According to information provided in the DEIR (Sections 3.13.5.4 and 3.13.5.5), asbestos and lead-based paint sampling and abatement has been performed on the existing buildings in the project area. All known lead-based paint has been removed from buildings constructed before 1960, and all buildings constructed in 1978 or before have been assessed for the presence of lead-based paint. A biennial monitoring and sampling program performed by the U.S. Navy is in effect.

The report also states: "All known damaged, friable, or accessible ACM has been abated within most areas of TI and YBI, including the area of Quarters 10/Building 267 (these two buildings would be relocated during implementation of Alternative 2b). Remaining ACM does not pose a threat to human health."

### 4.0 REGULATORY RECORDS REVIEW

AECOM reviewed a search of environmental records conducted by Environmental Data Resources, Inc. (EDR). The search was centered on the intersection of Gate Road and 4<sup>th</sup> Street, within the project area but not specific to it, since a defined street address is needed for information to be returned for some of the historical sources. Search radii were those required for ASTM Standard Practice E1527-05, for Phase I Environmental Site Assessments. A copy of EDR's report is located in Appendix C, along with EDR Site Reports for two ERNS (spill) listings. The following environmental regulatory databases were reviewed as specified for the project site and adjacent and nearby properties:

Database Reviewed	Responsible Agency	Search Radius (miles)
<b>Federal ASTM Standard Databases</b>		
Federal National Priorities List (NPL), Proposed NPL, Delisted NPL, NPL Areas of Concern, NPL Recovery	U.S. Environmental Protection Agency (EPA)	1.0
Federal Comprehensive Environmental Response, Compensation & Liability Information System (CERCLIS)	U.S. EPA	0.5
CERCLIS - NFRAP (No Further Remedial Action Planned)	U.S. EPA	0.25
Federal Corrective Action Report (CORRACTS)	U.S. EPA	1.0
Federal Resource Conservation and Recovery Act (RCRA) Treatment, Storage and Disposal (TSD) Facilities List	U.S. EPA	0.5
Federal RCRA Generators List (RCRA – SQG, RCRA – LQG)	U.S. EPA	0.25
Emergency Response Notification System (ERNS)	U.S. EPA	Subject Property



# YERBA BUENA ISLAND RAMPS IMPROVEMENT PROJECT

Yerba Buena Island, San Francisco County, California

Database Reviewed	Responsible Agency	Search Radius (miles)
<b>State of California ASTM Standard Databases</b>		
Annual Work Plan (AWP) Sites	California Environmental Protection Agency (CalEPA)	1.0
Abandoned Sites Program (Cal-Sites)	CalEPA Department of Toxic Substances Control (DTSC)	0.5
Hazardous Material Incident Report System (CHMIRS)	Office of Emergency Services	Subject Property
Cortese List (Combined Report List for Leaking USTs, Solid Waste Landfills [SWLs] and CalSites; inactive)	CalEPA and Office of Emergency Services	0.5
State Proposition 65 (LUST only)	SWRCB	1.0
Toxic Pits Cleanup Act Sites	SWRCB	1.0
State Solid Waste Information System (Landfills/SWIS)	State Integrated Waste Management Board (IWMB)	0.5
State Waste Management Unit Database (WMUDS), Solid Waste Assessment Test (SWAT)	SWRCB	0.5 (SWLs and SWAT)
State Leaking Underground Storage Tanks (LUST)	State Water Resources Control Board (SWRCB) and Regional Water Quality Control Board (RWQCB)	0.5
State Bond Expenditure Plan (BEP)	California Department of Health Services (DHS)	1.0
Underground Storage Tanks (USTs), Historical USTs, Facility Index Database (FID) USTs, Sweeps USTs	SWRCB	0.25
Voluntary Cleanup Program (VCP) Properties	CalEPA DTSC	0.5
Indian Lands UST, Indian Lands LUST, Indian Reservations	U.S. EPA Region IX	0.25, 0.5, 1.0
State Waste Recycling Facilities (SWRCY)	Dept. of Conservation	0.5
<b>Federal ASTM Supplemental Databases</b>		
Federal Superfund Consent Decrees (CONSENT)	U.S. EPA	1.0
Federal Records of Decision (ROD)	NTIS	1.0
Federal Facility Index System (FINDS)	U.S. EPA/NTIS	Subject Property
Federal Hazardous Materials Spill Incidents (HMIRS)	U.S. Department of Transportation (DOT)	Subject Property
Federal Material Licensing Tracking System (MLTS) for Radioactive Materials	Nuclear Regulatory Commission	Subject Property
Federal Mines Master Index File (MINES)	U.S. Department of Labor, Mine Safety and Health Administration	0.25
Federal Superfund Liens	U.S. EPA	Subject Property
Federal PCB Activity Database (PADS)	U.S. EPA	Subject Property
Uranium Mill Tailings (UMTRA)	E.S. EPA	0.5



**YERBA BUENA ISLAND RAMPS IMPROVEMENT PROJECT***Yerba Buena Island, San Francisco County, California*

<b>Database Reviewed</b>	<b>Responsible Agency</b>	<b>Search Radius (miles)</b>
Federal Engineering Controls	U.S. EPA	0.5
ODI (Open Dump Inventory)	U.S. EPA	0.5
FUDS (Formerly Used Defense Sites)	U.S. Army Corps of Engineers	1.0
Federal Department of Defense Sites (DOD)	U.S. Geological Survey	1.0
Federal RCRA Administrative Action Tracking System (RAATS)	U.S. EPA	Subject Property
Federal Toxic Release Inventory System (TRIS)	U.S. EPA/NTIS	Subject Property
Federal Toxic Substances Control Act (TSCA) Chemical Substance Inventory Control List	U.S. EPA/NTIS	Subject Property
Federal Section 7 Tracking Systems (SSTS) for Registered Pesticide-Producing Establishments	Section 7 of the Federal Insecticide, Fungicide and Rodenticide Act (FIFRA)	Subject Site
FIFRA/TSCA Tracking System (FTTS) for Administrative Cases and Pesticide Enforcement Actions and Compliance Activities Related to FIFRA, TSCA and EPCRA (Emergency Planning and Community Right-to-Know Act)	U.S. EPA Office of Prevention, Pesticides and Toxic Substances	Subject Property
<b>State and Local ASTM Supplemental Databases</b>		
State Aboveground Petroleum Storage Tanks (ASTs)	SWRCB	Subject Property
State Drycleaner Facilities with Waste Generator Identification Numbers (Cleaners)	CalEPA DTSC	0.25
State Waste Discharge System (WDS)	SWRCB	Subject Property
State List of Deed Restrictions (DEED)	CalEPA DTSC	Subject Property
State Properties Needing Further Evaluation (NFE)	CalEPA DTSC	Adjacent Properties
State School Property Evaluation Program (SCH)	CalEPA DTSC	Adjacent Properties
Well Investigation Program (WIP)	RWQCB	0.25
Air Emissions Permits (EMI)	AQMD	Subject Property
State Unconfirmed Properties Referred to Another Agency (REF)	CalEPA DTSC	Adjacent Properties
State No Further Action Properties (NFA)	CalEPA DTSC	Adjacent Properties
State Toxic Leak Site Investigations (SLIC)	RWQCB	0.5
State Hazardous Waste Information System (HazNet) for Waste Generators	CalEPA	Adjacent Properties
County Hazardous Materials Sites (HMS)	County Agency	Subject Property
County Site Mitigation	County Agency	Subject Property
<b>Tribal Records</b>		
Indian Reservations	U.S. Geological Survey	1.0

**YERBA BUENA ISLAND RAMPS IMPROVEMENT PROJECT***Yerba Buena Island, San Francisco County, California*

Database Reviewed	Responsible Agency	Search Radius (miles)
Indian Leaking Underground Storage Tanks	U.S. EPA	0.5
Indian Underground Storage Tanks	U.S. EPA	0.25
<b>Brownfields Databases</b>		
U.S. Brownfields	U.S. EPA	0.5
U.S. Institutional Controls	U.S. EPA	0.5
<b>EDR Proprietary Historical Databases</b>		
Gas Stations and Dry Cleaners	EDR	0.25
Coal Gas Manufacturing Plants	EDR	1.0

Yerba Buena Island appears on the FUDS, ERNS, ENVIROSTOR and Historical UST databases. These listings are for the Island as a whole and are not necessarily specific to the project site, although the plotted location (EDR Map Codes A1 through A5) is within the project area, approximately at the east end of the Yerba Buena Island tunnel. The listings are as follows:

- FUDS: The 10.917-acre Coast Guard facility on the east end of YBI, which includes part of the project site, is eligible for funding under the FUDS (Formerly Used Defense Sites) program; the remainder of YBI, which remains under the possession of the Navy, is not.
- ERNS (Yerba Buena Island Group San Francisco): This listing was for a spill or release on the Coast Guard cutter *Buttonwood* in 1996. A spill occurred from a hose during fueling operations; a sheen that was observed (presumably on the water in San Francisco Bay) dissipated, and absorbents were used on deck. This incident does not appear to indicate a current environmental concern.
- ERNS (Yerba Buena Island Floating Docks): This listing was for a spill or release from an oil/water separator line in 1996. The spill (presumably on the water in San Francisco Bay) was contained and cleaned up. This incident does not appear to indicate a current environmental concern.
- ENVIROSTOR: This listing is for a site subject to evaluation under the FUDS program (see above). It is listed as inactive. Review of information on the Department of Toxic Substances Control Envirostor website did not reveal any additional information.
- Historical UST: The listing indicates a former 1,000-gallon UST for diesel fuel at a location listed as Yerba Buena West. The tank was installed in 1982. Review of underground storage tank location data on the Water Quality Control Board's Geotracker database showed a permitted UST in the southwest part of YBI, approximately at the west portal of the YBI Tunnel. This tank would be beyond



**YERBA BUENA ISLAND RAMPS IMPROVEMENT PROJECT**

*Yerba Buena Island, San Francisco County, California*

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the footprint of the Proposed Project and not hydraulically upgradient from any part of it.

The former Naval Station Treasure Island appears on numerous databases, including the DOD, CERCLIS, RCRA – Large Quantity Generator, ROD, NPDES, Manifest and HAZNET databases; the Department of Defense area of concern encompasses most of Yerba Buena Island, including most of the project site. These listings reflect the former status of Naval Station Treasure Island as a military base. Due to the conformation of the Yerba Buena Island-Treasure Island landmass and the surrounding San Francisco Bay, impacts to the project site from Naval Station Treasure Island specifically are highly unlikely to occur.

No other sites were listed. Review of the Orphan Summary of unmappable sites showed six ERNS listings at 1 Yerba Buena Island Road, which is on the north side of YBI approximately 500 feet west of the project site.



## **5.0 CONCLUSIONS AND RECOMMENDATIONS**

The Initial Site Assessment Checklist form is presented in Appendix A. Based upon our review of the information obtained during the course of our environmental assessment of this subject site and herein presented, we have formed the following opinions:

- The project site is located on the east side of Yerba Buena Island, in an area formerly occupied by U.S. Navy and U.S. Coast Guard installations. Parts of three Installation Restoration (IR) sites, including a sludge spreading area, a landfill, and an area of known soil impacts possibly associated with former military operations, are within the project site. A fourth IR site, a closed Leaking Underground Storage Tank case, is also within the project area. Soil and groundwater contamination by petroleum hydrocarbons, heavy metals, volatile and semivolatile organic compounds and pesticides have been found on the IR sites. The extent of contamination has been delineated but Remedial Investigations for the three open IR sites are pending.
- Several other military sites are located on the western side of Yerba Buena Island, or on the nearby Treasure Island. The potential for impact to the project site from these other sites appears to be low.
- The presence of documented soil and groundwater contamination at three installation Restoration sites within the project area constitutes a Recognized Environmental Condition pertaining to the project site. Although the extent of contamination has been delineated at each of the IR sites, once a preferred alternative for the Proposed Project is selected, additional delineation of the contamination should be performed to finalized details of construction, to develop procedures for handling of contaminated media, and to ensure worker safety during construction.
- The Leaking Underground Storage Tank site (IR Site 270), which received a no Further Action letter in 2004, constitutes a Historical Recognized Environmental Condition. No immediate environmental concerns are evident in regards to this former leaking tank.

## **6.0 LIMITATIONS**

The conclusions and recommendations presented in this report are based upon visual reconnaissance of the project site and research of available materials within the scope and budget of the contract. The information presented is relevant to the dates of our site visit and should not be relied upon to represent conditions at later dates.

The opinions expressed herein are based on information obtained during our effort and on our experience. If additional information becomes available, we request the opportunity to review the information and modify our opinions, if necessary.

**YERBA BUENA ISLAND RAMPS IMPROVEMENT PROJECT**

*Yerba Buena Island, San Francisco County, California*

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Our services have been provided using that degree of care and skill ordinarily exercised, under similar circumstances, by environmental consultants practicing in this or similar localities. No other warranty, expressed or implied, is made as to the professional opinions presented in this report. AECOM is not responsible for the conclusions, opinions, or recommendations made by others based on this information.





# **APPENDIX A**

## ***INITIAL SITE ASSESSMENT CHECKLIST***

# Initial Site Assessment (ISA) Checklist

## Project Information

District: 4      County: San Francisco      Route: Interstate 80      Post Mile: 7.6 to 8.1      EA: 04-3A640K

### Description:

Yerba Buena Island (YBI) is located in San Francisco Bay, approximately halfway between Oakland and San Francisco, and is accessible by vehicles only via the San Francisco-Oakland Bay Bridge (SFOBB), which is part of Interstate 80 (I-80). The SFOBB is a critical link in the interstate network, providing access between San Francisco and the East Bay. YBI and the SFOBB also provide access to Treasure Island (TI), which lies to the north of YBI. YBI and TI are accessed by on-and off-ramps located on the upper and lower decks of the SFOBB. The SFOBB and the associated on- and off-ramps provide the only land access to the active US Coast Guard facilities located on the southern side of YBI.

The proposed project would replace the existing westbound on-ramp and the westbound off-ramp located on the eastern side of YBI with a new westbound on-ramp and a new westbound off-ramp that would improve the functional roles of the current ramps. Build alternatives have been proposed to address the geometric and operational deficiencies of the existing on- and off-ramps and their effects on the SFOBB (I-80) mainline without degrading the mainline operation as compared to no action. This YBI Ramps Improvement Project is separate from and independent of the SFOBB East Span Seismic Safety Project (ESSSP), which is currently under construction. The proposed new ramps would improve operations of the ramps and provide connections between YBI and the transition structure of the new SFOBB. The proposed project is located between Post Mile (PM) 7.6 and PM 8.1, starting at the east portal of the YBI tunnel and ending before the SFOBB Transition Structure.

The purpose of the project is to address the geometric and operational deficiencies of the existing on- and off-ramps, to the extent physically and economically feasible; improve traffic operations to and from the SFOBB; and to improve traffic safety by increasing deceleration length for the westbound off-ramps and increasing merging distance for westbound on-ramps on the east side of YBI. The YBI ramps currently do not meet Caltrans geometric standards. They have not been significantly updated since the 1960s and have an above average accident rate. These conditions, combined with their nonstandard entrances and exits, create traffic operational constraints. In addition, the deceleration length of the off-ramps and the merging distance for the on-ramps are insufficient and not up to current standards. The limited merging and deceleration distances make it challenging for vehicles to enter and exit traffic flows on the SFOBB. The ramps have been designed to accommodate future traffic operations for the 20-year design horizon as required by Caltrans standards.

Is the project on the HW Study Minimal-Risk Projects List (HW1)? No

Project Manager:                      Eric Corboda                      Phone #: 415-955-2904

Project Engineer:                      Bob Zandipour                      Phone #: 510-286-5709

## Project Screening

Attach the project location map to this checklist to show location of all known and/or potential HW sites identified. See Appendix B.

1. Project Features: New R/W? No

Excavation? Yes (footing)

Railroad Involvement? No

Structure demolition/modification? Yes

Subsurface utility relocation? Yes

## 2. Project Setting

**Rural or Urban:** Rural

**Current land uses:** Military (Coast Guard, U.S. Navy), Caltrans

**Adjacent land uses (industrial, light industry, commercial, agricultural, residential, etc.):** *Military support areas with barracks, buoy repair shop, offices, storage: Caltrans substation/compressor station and tow truck housing, and public roadways.*

**3. Check federal, State, and local environmental and health regulatory agency records as necessary, to see if any known hazardous waste site is in or near the project area. If a known site is identified, show its location on the attached map and attach additional sheets, as needed, to provide pertinent information for the proposed project.**

*See Section 4.0 of attached report: Yerba Buena Island is listed in the FUDS, ERNS, Envirostor and Historical UST databases. Of these only the FUDS listing refers to the area of the Proposed Project.*

**4. Conduct Field Inspection. Date:** June 2, 2010.

Use the attached map to locate potential or known HW sites.

### STORAGE STRUCTURES / PIPELINES:

<b>Underground tanks:</b>	Former	<b>Surface tanks:</b>	No
<b>Sumps:</b>	No	<b>Ponds:</b>	No
<b>Drums:</b>	No	<b>Basins:</b>	No
<b>Transformers:</b>	No	<b>Landfill:</b>	Yes (former)

**Other:** *Four Installation Restoration (IR) sites present in parts of the project site (see below and Appendix B)*

### CONTAMINATION: (spills, leaks, illegal dumping, etc.)

<b>Surface staining:</b>	None observed	<b>Oil sheen:</b>	None observed
<b>Odors:</b>	None observed	<b>Vegetation damage:</b>	None observed

**Other:** *Evidence of contamination was not observed in the field, but the existence of soil and groundwater contamination has been documented at four U.S. Navy sites within the boundaries of the proposed project. Assessment and cleanup of the sites is the responsibility of the Federal government under the Installation Restoration (IR) program. Based on information in the DEIR, the sites are as follows:*

*IR Site 8: Former U.S. Army Point Sludge Disposal Area (pesticides, heavy metals including beryllium and lead)*

*IR Site 11: Former U.S. Army and U.S. Navy Landfill (acetone, benzene, polynuclear aromatic hydrocarbons, phenols, pesticides, diesel)*

*IR Site 29: East Side Contaminated Bridge Soils (lead, petroleum hydrocarbons)*

*IR Site 270: Former U.S. Navy Underground Storage Tank #270 (diesel)*

*Based on information in the DEIR, the extent of contamination at all four of these sites has been fully characterized. The Navy is preparing Remedial Investigation reports for sites 8, 11 and 29, and is discussing closeout of these three sites with Caltrans. Site 270 has received a No Further Action letter from the Regional Water Quality Control Board.*

### HAZARDOUS MATERIALS: (asbestos, lead, etc.)

**Asbestos:** *All known friable and damaged nonfriable asbestos-containing materials have been abated.*



**Lead-based paint:** *All buildings constructed before 1960 have been abated. All buildings constructed from 1960 to 1978 have been assessed and are subject to biennial inspection and sampling.*

**Serpentine:** *Not mapped on Yerba Buena Island (see U.S. Geological Survey Miscellaneous Field Studies MF 2342, Geologic Map and Map Database of the Oakland Metropolitan Area, Alameda, Contra Costa, and San Francisco Counties, California, by R.W. Graymer, 2000).*

**5. Additional record search, as necessary, of subsequent land uses that could have resulted in a hazardous waste site. Use the attached map to show the location of potential hazardous waste sites. See Section 4.0 and Appendix C of the attached report (EDR Site Reports for two spill incidents are in the EDR Site Reports at the end of the regulatory records search.**

### **ISA Determination**

**Does the project have potential hazardous waste involvement?** Yes

**If there is known or potential hazardous waste involvement, is additional ISA work needed before task orders can be prepared for the Investigation?** No

A brief memo should be prepared to transmit the ISA conclusions to the Project Manager and Project Engineer.

**ISA Conducted by** *Julie Wilson* **Date** *June 8, 2010*

## **APPENDIX B**

### ***SITE VICINITY MAP AND PROJECT PLANS***



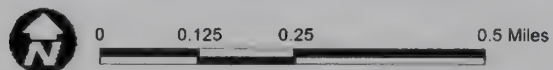






Project Area

Source: Google, EDAW/AECOM 2009



**Figure 1-2**  
**Vicinity Map**

**Yerba Buena Island Ramps EIR/EIS**

P:\2008\108080090 Yerba Buena Island Interchange\5.0 Graphics (Non-CAD)\5.7 Report Graphics\Figures\Figure 1-2 vicinity map new ai (dbrady) 9/15/09

# OVERVIEW MAP - 2781761.2s



★ Target Property

▲ Sites at elevations higher than or equal to the target property

◆ Sites at elevations lower than the target property

▲ Manufactured Gas Plants

□ National Priority List Sites

□ Dept. Defense Sites

□ Indian Reservations BIA

— County Boundary

— Power transmission lines

— Oil & Gas pipelines

□ 100-year flood zone

□ 500-year flood zone

■ National Wetland Inventory

□ Areas of Concern

This report includes Interactive Map Layers to display and/or hide map information. The legend includes only those icons for the default map view.

SITE NAME: Yerba Buena Island Offramps

ADDRESS: Gate Road/4th Street  
San Francisco CA 94130

LAT/LONG: 37.8121 / 122.3625

CLIENT: AECOM

CONTACT: Robert Olsen

INQUIRY #: 2781761.2s

DATE: June 01, 2010 12:52 pm





#### Alternative 4 Proposed Ramps

- Proposed Westbound Off Ramp
- Proposed Westbound On-Ramp
- Proposed Macalla Road Improvements

#### Separate Project Currently Under Construction

- San Francisco-Oakland Bay Bridge East Span Seismic Safety Project
- Transition Structure Portion of SFOBB

Source: Nima/USGS 2004; DMJM Harris, EDAW 5/09



Not To Scale

**Figure 2-2**  
**Alternative 4**

#### Yerba Buena Island Ramps EIR/EIS

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#### Alternative 2b Proposed Ramps

- Proposed Westbound Off-Ramp
- Proposed Westbound On-Ramp
- Proposed Macalla Road Improvements

#### Separate Project Currently Under Construction

- San Francisco-Oakland Bay Bridge East Span Seismic Safety Project
- Transition Structure Portion of SFOBB

Source: Nima/USGS 2004; DMJM Harris, EDAW 5/09



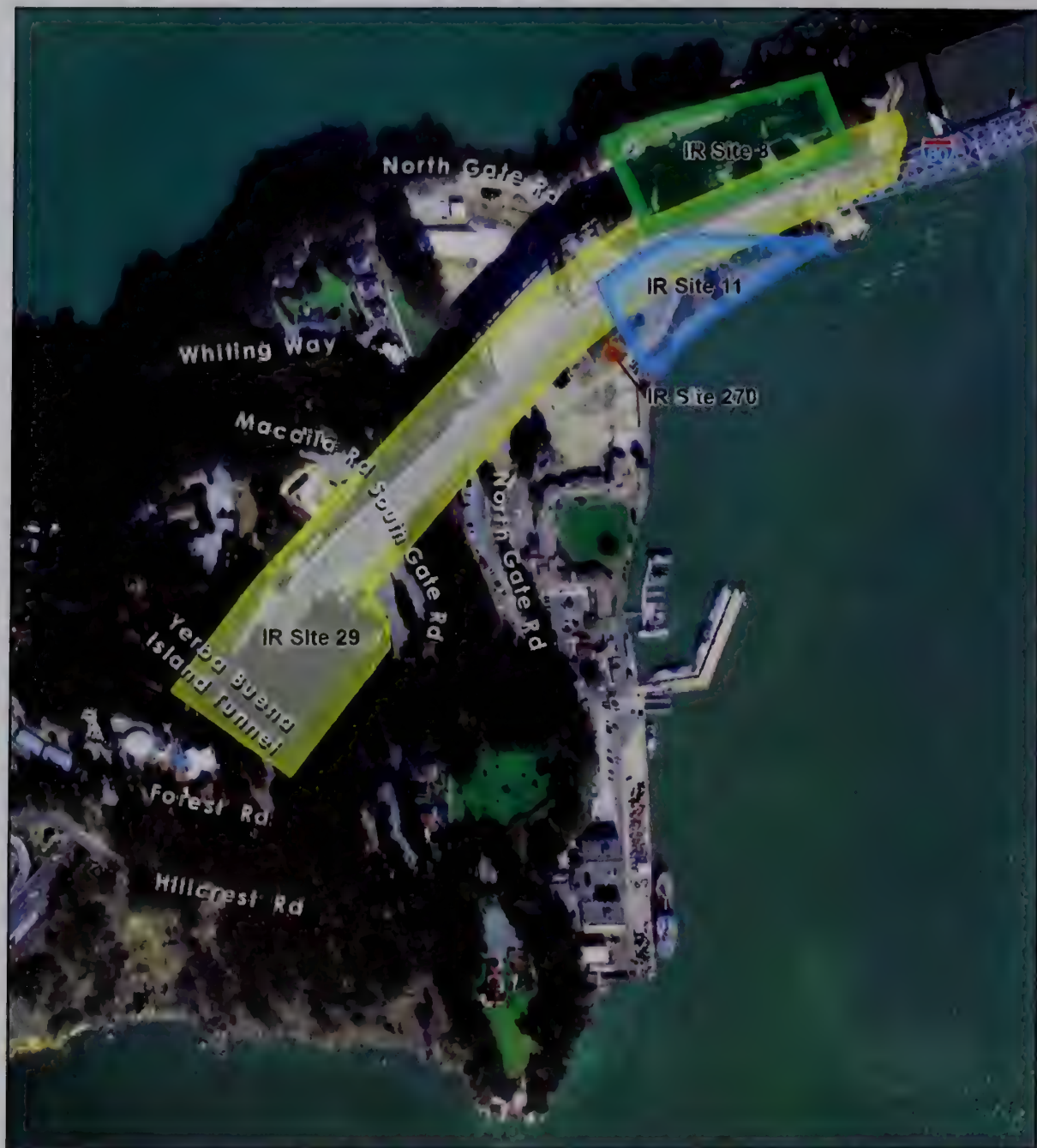
Not To Scale

**Figure 2-1**  
**Alternative 2b**

Yerba Buena Island Ramps EIR/EIS

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Source: TerraServer 2004; EDAW, County of San Francisco



0 250 500 1000 Feet

**Figure 3.13-1**  
**Potential Contamination Sources**

Yerba Buena Island Ramps EIR/EIS

P:\2008\08080090 Yerbu Buena Island Interchange\5.0 Graphics (Non-CAD)\5.7 Report Graphics\Figures\Figure 3.13-1 contamination sources ai (lbrady) 9/15/09



## **APPENDIX C**

# ***REGULATORY DATABASE SEARCH***



**Yerba Buena Island Offramps**

Gate Road/4th Street  
San Francisco, CA 94130

Inquiry Number: 2781761.2s  
June 01, 2010

The EDR Radius Map Report with GeoCheck®



## TABLE OF CONTENTS

<u>SECTION</u>	<u>PAGE</u>
Executive Summary .....	ES1
Overview Map .....	2
Detail Map .....	3
Map Findings Summary .....	4
Map Findings .....	7
Orphan Summary .....	21
Government Records Searched/Data Currency Tracking .....	GR-1

### GEOCHECK ADDENDUM

Physical Setting Source Addendum .....	A-1
Physical Setting Source Summary .....	A-2
Physical Setting SSURGO Soil Map .....	A-5
Physical Setting Source Map .....	A-9
Physical Setting Source Map Findings .....	A-11
Physical Setting Source Records Searched .....	A-12

***Thank you for your business.***  
Please contact EDR at 1-800-352-0050  
with any questions or comments.

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## EXECUTIVE SUMMARY

A search of available environmental records was conducted by Environmental Data Resources, Inc (EDR). The report was designed to assist parties seeking to meet the search requirements of EPA's Standards and Practices for All Appropriate Inquiries (40 CFR Part 312), the ASTM Standard Practice for Environmental Site Assessments (E 1527-05) or custom requirements developed for the evaluation of environmental risk associated with a parcel of real estate.

### TARGET PROPERTY INFORMATION

#### ADDRESS

GATE ROAD/4TH STREET  
SAN FRANCISCO, CA 94130

#### COORDINATES

Latitude (North): 37.812100 - 37° 48' 43.6"  
Longitude (West): 122.362500 - 122° 21' 45.0"  
Universal Transverse Mercator: Zone 10  
UTM X (Meters): 556115.0  
UTM Y (Meters): 4184953.8  
Elevation: 34 ft. above sea level

### USGS TOPOGRAPHIC MAP ASSOCIATED WITH TARGET PROPERTY

Target Property Map: 37122-G3 OAKLAND WEST, CA  
Most Recent Revision: 1980  
  
West Map: 37122-G4 SAN FRANCISCO NORTH, CA  
Most Recent Revision: 1999

### AERIAL PHOTOGRAPHY IN THIS REPORT

Photo Year: 2005  
Source: USDA

### TARGET PROPERTY SEARCH RESULTS

The target property was identified in the following records. For more information on this property see page 7 of the attached EDR Radius Map report:

Site	Database(s)	EPA ID
YERBA BUENA ISLAND SAN FRANCISCO, CA	FUDS	N/A
YERBA BUENA ISLAND GROUP SAN FRAN YERBA BUENA ISLAND GROUP SAN FRANCISCO SAN FRANCISCO, CA	ERNS	N/A
YERBA BUENA ISLAND STATION FLOATI YERBA BUENA ISLAND STATION FLOATING DOCKS SAN FRANCISCO, CA 94130	ERNS	N/A
YERBA BUENA ISLAND PROPERTY (J09C SAN FRANCISCO, CA	ENVIROSTOR Status: Inactive - Needs Evaluation	N/A

## EXECUTIVE SUMMARY

YERBA BUENA WEST  
150 4TH ST  
SAN FRANCISCO, CA 94103

HIST UST

N/A

### DATABASES WITH NO MAPPED SITES

No mapped sites were found in EDR's search of available ("reasonably ascertainable ") government records either on the target property or within the search radius around the target property for the following databases:

### STANDARD ENVIRONMENTAL RECORDS

#### ***Federal NPL site list***

NPL..... National Priority List  
Proposed NPL..... Proposed National Priority List Sites  
NPL LIENS..... Federal Superfund Liens

#### ***Federal Delisted NPL site list***

Delisted NPL..... National Priority List Deletions

#### ***Federal CERCLIS list***

CERCLIS..... Comprehensive Environmental Response, Compensation, and Liability Information System  
FEDERAL FACILITY..... Federal Facility Site Information listing

#### ***Federal CERCLIS NFRAP site List***

CERC-NFRAP..... CERCLIS No Further Remedial Action Planned

#### ***Federal RCRA CORRACTS facilities list***

CORRACTS..... Corrective Action Report

#### ***Federal RCRA non-CORRACTS TSD facilities list***

RCRA-TSDF..... RCRA - Treatment, Storage and Disposal

#### ***Federal RCRA generators list***

RCRA-LQG..... RCRA - Large Quantity Generators  
RCRA-SQG..... RCRA - Small Quantity Generators  
RCRA-CESQG..... RCRA - Conditionally Exempt Small Quantity Generator

#### ***Federal institutional controls / engineering controls registries***

US ENG CONTROLS..... Engineering Controls Sites List  
US INST CONTROL..... Sites with Institutional Controls



## EXECUTIVE SUMMARY

### **State- and tribal - equivalent NPL**

RESPONSE..... State Response Sites

### **State and tribal landfill and/or solid waste disposal site lists**

SWF/LF..... Solid Waste Information System

### **State and tribal leaking storage tank lists**

LUST..... Geotracker's Leaking Underground Fuel Tank Report  
SLIC..... Statewide SLIC Cases  
INDIAN LUST..... Leaking Underground Storage Tanks on Indian Land

### **State and tribal registered storage tank lists**

UST..... Active UST Facilities  
AST..... Aboveground Petroleum Storage Tank Facilities  
INDIAN UST..... Underground Storage Tanks on Indian Land  
FEMA UST..... Underground Storage Tank Listing

### **State and tribal voluntary cleanup sites**

INDIAN VCP..... Voluntary Cleanup Priority Listing  
VCP..... Voluntary Cleanup Program Properties

### **ADDITIONAL ENVIRONMENTAL RECORDS**

#### **Local Brownfield lists**

US BROWNFIELDS..... A Listing of Brownfields Sites

#### **Local Lists of Landfill / Solid Waste Disposal Sites**

DEBRIS REGION 9..... Torres Martinez Reservation Illegal Dump Site Locations  
ODL..... Open Dump Inventory  
WMUDS/SWAT..... Waste Management Unit Database  
SWRCY..... Recycler Database  
HAULERS..... Registered Waste Tire Haulers Listing  
INDIAN ODL..... Report on the Status of Open Dumps on Indian Lands

#### **Local Lists of Hazardous waste / Contaminated Sites**

US CDL..... Clandestine Drug Labs  
HIST Cal-Sites..... Historical Calsites Database  
SCH..... School Property Evaluation Program  
Toxic Pits..... Toxic Pits Cleanup Act Sites  
CDL..... Clandestine Drug Labs  
US HIST CDL..... National Clandestine Laboratory Register

#### **Local Lists of Registered Storage Tanks**

CA FID UST..... Facility Inventory Database

## EXECUTIVE SUMMARY

SWEEPS UST..... SWEEPS UST Listing

### **Local Land Records**

LIENS 2..... CERCLA Lien Information  
 LUCIS..... Land Use Control Information System  
 LIENS..... Environmental Liens Listing  
 DEED..... Deed Restriction Listing

### **Records of Emergency Release Reports**

HMIRS..... Hazardous Materials Information Reporting System  
 CHMIRS..... California Hazardous Material Incident Report System  
 LDS..... Land Disposal Sites Listing  
 MCS..... Military Cleanup Sites Listing

### **Other Ascertainable Records**

RCRA-NonGen..... RCRA - Non Generators  
 DOT OPS..... Incident and Accident Data  
 CONSENT..... Superfund (CERCLA) Consent Decrees  
 UMTRA..... Uranium Mill Tailings Sites  
 MINES..... Mines Master Index File  
 TRIS..... Toxic Chemical Release Inventory System  
 TSCA..... Toxic Substances Control Act  
 FTTS..... FIFRA/ TSCA Tracking System - FIFRA (Federal Insecticide, Fungicide, & Rodenticide Act)/TSCA (Toxic Substances Control Act)  
 HIST FTTS..... FIFRA/TSCA Tracking System Administrative Case Listing  
 SSTS..... Section 7 Tracking Systems  
 ICIS..... Integrated Compliance Information System  
 PADS..... PCB Activity Database System  
 MLTS..... Material Licensing Tracking System  
 RADINFO..... Radiation Information Database  
 FINDS..... Facility Index System/Facility Registry System  
 RAATS..... RCRA Administrative Action Tracking System  
 CA BOND EXP. PLAN..... Bond Expenditure Plan  
 CA WDS..... Waste Discharge System  
 NPDES..... NPDES Permits Listing  
 Cortese..... "Cortese" Hazardous Waste & Substances Sites List  
 HIST CORTESE..... Hazardous Waste & Substance Site List  
 Notify 65..... Proposition 65 Records  
 DRYCLEANERS..... Cleaner Facilities  
 WIP..... Well Investigation Program Case List  
 HAZNET..... Facility and Manifest Data  
 EML..... Emissions Inventory Data  
 INDIAN RESERV..... Indian Reservations  
 SCR DRYCLEANERS..... State Coalition for Remediation of Drycleaners Listing  
 FINANCIAL ASSURANCE..... Financial Assurance Information Listing  
 HWP..... EnviroStor Permitted Facilities Listing  
 HWT..... Registered Hazardous Waste Transporter Database  
 COAL ASH EPA..... Coal Combustion Residues Surface Impoundments List  
 PCB TRANSFORMER..... PCB Transformer Registration Database  
 COAL ASH DOE..... Sleam-Electric Plan Operation Data  
 MWMP..... Medical Waste Management Program Listing  
 PROC..... Certified Processors Database

## EXECUTIVE SUMMARY

### EDR PROPRIETARY RECORDS

#### ***EDR Proprietary Records***

Manufactured Gas Plants..... EDR Proprietary Manufactured Gas Plants  
EDR Historical Auto Stations... EDR Proprietary Historic Gas Stations  
EDR Historical Cleaners..... EDR Proprietary Historic Dry Cleaners

### SURROUNDING SITES: SEARCH RESULTS

Surrounding sites were identified in the following databases.

Elevations have been determined from the USGS Digital Elevation Model and should be evaluated on a relative (not an absolute) basis. Relative elevation information between sites of close proximity should be field verified. Sites with an elevation equal to or higher than the target property have been differentiated below from sites with an elevation lower than the target property.

Page numbers and map identification numbers refer to the EDR Radius Map report where detailed data on individual sites can be reviewed.

Sites listed in ***bold italics*** are in multiple databases.

Unmappable (orphan) sites are not considered in the foregoing analysis.

### ADDITIONAL ENVIRONMENTAL RECORDS

#### ***Other Ascertainable Records***

DOD: Consists of federally owned or administered lands, administered by the Department of Defense, that have any area equal to or greater than 640 acres of the United States, Puerto Rico, and the U.S. Virgin Islands.

A review of the DOD list, as provided by EDR, and dated 12/31/2005 has revealed that there is 1 DOD site within approximately 1 mile of the target property.

<u>Equal/Higher Elevation</u>	<u>Address</u>	<u>Direction / Distance</u>	<u>Map ID</u>	<u>Page</u>
TREASURE ISLAND NAVAL BASE (CL		0 - 1/8 (0.000 mi.)	0	9

ROD: Record of Decision. ROD documents mandate a permanent remedy at an NPL (Superfund) site containing technical and health information to aid the cleanup.

A review of the ROD list, as provided by EDR, and dated 04/29/2010 has revealed that there is 1 ROD site within approximately 1 mile of the target property.

<u>Lower Elevation</u>	<u>Address</u>	<u>Direction / Distance</u>	<u>Map ID</u>	<u>Page</u>
FORMER NAVAL STATION, TREASURE	TREASURE ISL	NW 1/2 - 1 (0.890 mi.)	6	10

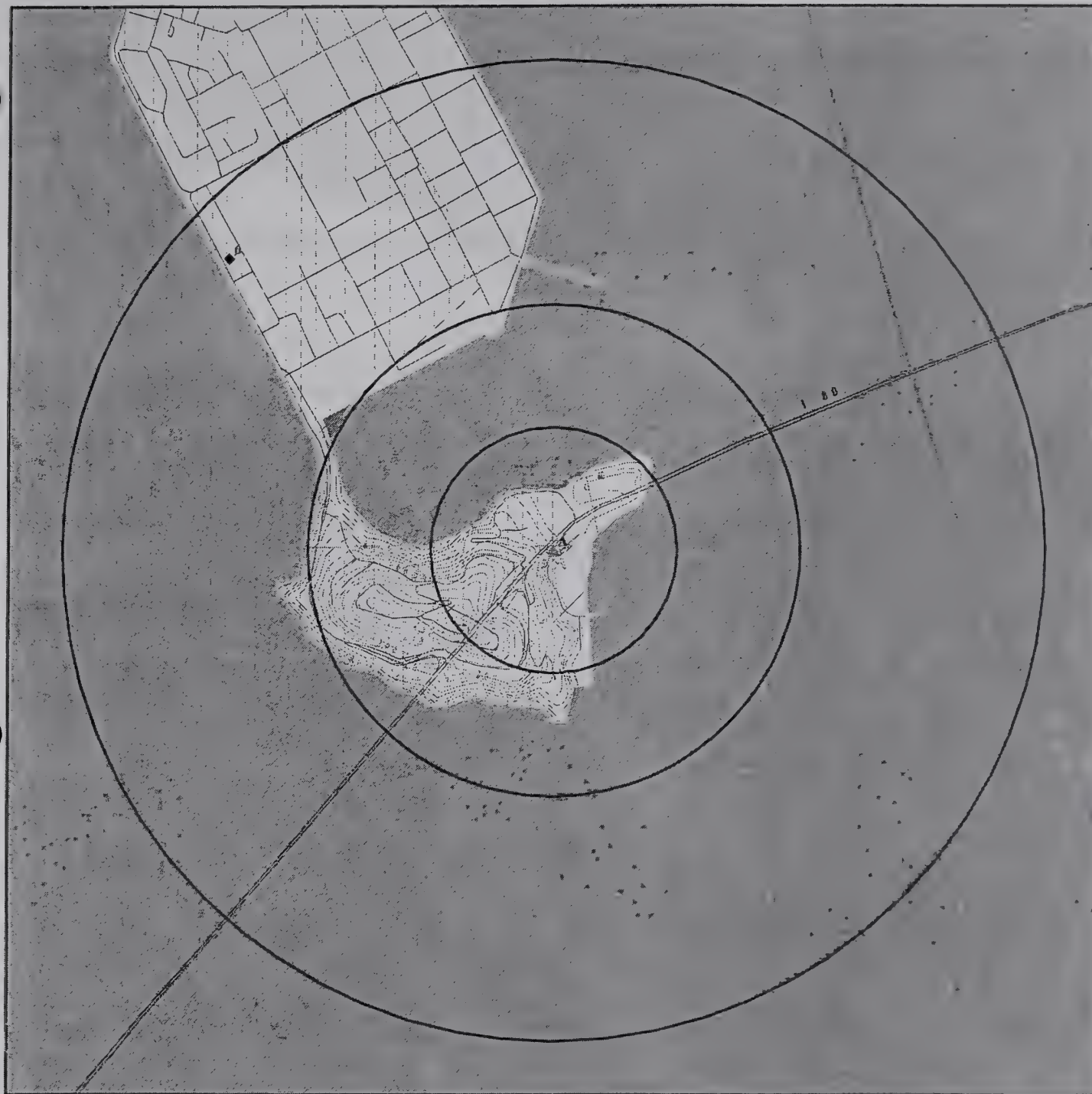


## EXECUTIVE SUMMARY

Due to poor or inadequate address information, the following sites were not mapped:

<u>Site Name</u>	<u>Database(s)</u>
GROVER MANAGEMENT & CONSTRUCTION	HAZNET,HIST CORTESE
US NAVY-NAVAL STATION TREASURE ISL	FTTS,HIST FTTS INSP
TREASURE ISLAND NAVAL STATION	HIST FTTS INSP
NAVAL STATION TREASURE ISLAND/SITE	AWP,ENVIROSTOR
NAVAL STATION TREASURE ISLAND/SITE	AWP,ENVIROSTOR
NAVAL STATION TREASURE ISLAND/SITE	AWP,ENVIROSTOR
NAVAL STATION TREASURE ISLAND/SITE	AWP,ENVIROSTOR
NAVAL STATION TRESURE ISLAND/SITE	AWP,ENVIROSTOR
NAVAL STATION TREASURE ISLAND/SITE	AWP,ENVIROSTOR
NAVAL STATION TREASURE ISLAND/SITE	AWP,ENVIROSTOR
NAVAL STATION TRESURE ISLAND/SITE	AWP,ENVIROSTOR
NAVAL STATION TREASURE ISLAND/SITE	AWP,ENVIROSTOR
NAVAL STATION TREASURE ISLAND/SITE	AWP,ENVIROSTOR
NAVAL STATION TRESURE ISLAND/SITE	CORTESE
NAVAL STATION TREASURE ISLAND/SITE	CORTESE
NAVAL STATION TREASURE ISLAND/SITE	CORTESE
NAVAL STATION TREASURE ISLAND/SITE	CORTESE
NAVAL STATION TREASURE ISLAND/SITE	CORTESE
NAVAL STATION TREASURE ISLAND/SITE	CORTESE
NAVAL STATION TREASURE ISLAND/SITE	CORTESE
NAVAL STATION TREASURE ISLAND/SITE	CORTESE
NAVAL STATION TREASURE ISLAND/SITE	CORTESE
TIYBI/ISLAND CREATIVE MANAGEMENT	UST ALAMEDA
3 TREASURE ISLAND 94130	AST
CCSF PUC TREASURE ISLAND WPCP	HAZNET
TREASURE ISLAND JOB CORP	HAZNET
CALTRANS DIST 4	RCRA-SQG,FINDS
ALCATRAZ ISLAND	ERNS
1 YERBA BUENA ISLAND	ERNS
1 YERBA BUENA ISLAND	ERNS
1 YERBA BUENA ISLAND	ERNS
1 YERBA BUENA ISLAND	ERNS
1 YERBA BUENA ISLAND	ERNS
1 YERBA BUENA ISLAND	ERNS
TREASURE ISLAND ELEMENTARY	FINDS

# OVERVIEW MAP - 2781761.2s



★ Target Property

▲ Sites at elevations higher than or equal to the target property

◆ Sites at elevations lower than the target property

▲ Manufactured Gas Plants

■ National Priority List Sites

■ Dept. Defense Sites

■ Indian Reservations BIA

— County Boundary

— Power transmission lines

— Oil & Gas pipelines

▨ 100-year flood zone

▨ 500-year flood zone

■ National Wetland Inventory

Areas of Concern

This report includes Interactive Map Layers to display and/or hide map information. The legend includes only those icons for the default map view.

SITE NAME: Yerba Buena Island Offramps  
ADDRESS: Gate Road/4th Street  
San Francisco CA 94130  
LAT/LONG: 37.8121 / 122.3625

CLIENT: AECOM  
CONTACT: Robert Olsen  
INQUIRY #: 2781761.2s  
DATE: June 01, 2010 12:52 pm

# DETAIL MAP - 2781761.2s



- ★ Target Property
- ▲ Sites at elevations higher than or equal to the target property
- ◆ Sites at elevations lower than the target property
- ▲ Manufactured Gas Plants
- ▲ Sensitive Receptors
- National Priority List Sites
- Dept. Defense Sites

0 1/16 1/8 1/4 Miles

- Indian Reservations BIA
- Oil & Gas pipelines
- National Wetland Inventory

■ Areas of Concern



This report includes Interactive Map Layers to display and/or hide map information. The legend includes only those icons for the default map view.

SITE NAME: Yerba Buena Island Offramps  
 ADDRESS: Gate Road/4th Street  
 San Francisco CA 94130  
 LAT/LONG: 37.8121 / 122.3625

CLIENT: AECOM  
 CONTACT: Robert Olsen  
 INQUIRY #: 2781761.2s  
 DATE: June 01, 2010 12:54 pm



## MAP FINDINGS SUMMARY

Database	Target Property	Search Distance (Miles)	< 1/8	1/8 - 1/4	1/4 - 1/2	1/2 - 1	> 1	Total Plotted
<b><u>STANDARD ENVIRONMENTAL RECORDS</u></b>								
<b><i>Federal NPL site list</i></b>								
NPL		1.000	0	0	0	0	NR	0
Proposed NPL		1.000	0	0	0	0	NR	0
NPL LIENS		TP	NR	NR	NR	NR	NR	0
<b><i>Federal Delisted NPL site list</i></b>								
Delisted NPL		1.000	0	0	0	0	NR	0
<b><i>Federal CERCLIS list</i></b>								
CERCLIS		0.500	0	0	0	NR	NR	0
FEDERAL FACILITY		1.000	0	0	0	0	NR	0
<b><i>Federal CERCLIS NFRAP site List</i></b>								
CERC-NFRAP		0.500	0	0	0	NR	NR	0
<b><i>Federal RCRA CORRACTS facilities list</i></b>								
CORRACTS		1.000	0	0	0	0	NR	0
<b><i>Federal RCRA non-CORRACTS TSD facilities list</i></b>								
RCRA-TSDF		0.500	0	0	0	NR	NR	0
<b><i>Federal RCRA generators list</i></b>								
RCRA-LQG		0.250	0	0	NR	NR	NR	0
RCRA-SQG		0.250	0	0	NR	NR	NR	0
RCRA-CESQG		0.250	0	0	NR	NR	NR	0
<b><i>Federal institutional controls / engineering controls registries</i></b>								
US ENG CONTROLS		0.500	0	0	0	NR	NR	0
US INST CONTROL		0.500	0	0	0	NR	NR	0
<b><i>Federal ERNS list</i></b>								
ERNS	X	TP	NR	NR	NR	NR	NR	0
<b><i>State- and tribal - equivalent NPL</i></b>								
RESPONSE		1.000	0	0	0	0	NR	0
<b><i>State- and tribal - equivalent CERCLIS</i></b>								
ENVIROSTOR	X	1.000	0	0	0	0	NR	0
<b><i>State and tribal landfill and/or solid waste disposal site lists</i></b>								
SWF/LF		0.500	0	0	0	NR	NR	0
<b><i>State and tribal leaking storage tank lists</i></b>								
LUST		0.500	0	0	0	NR	NR	0
SLIC		0.500	0	0	0	NR	NR	0

## MAP FINDINGS SUMMARY

Database	Target Property	Search Distance (Miles)	< 1/8	1/8 - 1/4	1/4 - 1/2	1/2 - 1	> 1	Total Plotted
INDIAN LUST		0.500	0	0	0	NR	NR	0
<b>State and tribal registered storage tank lists</b>								
UST		0.250	0	0	NR	NR	NR	0
AST		0.250	0	0	NR	NR	NR	0
INDIAN UST		0.250	0	0	NR	NR	NR	0
FEMA UST		0.250	0	0	NR	NR	NR	0
<b>State and tribal voluntary cleanup sites</b>								
INDIAN VCP		0.500	0	0	0	NR	NR	0
VCP		0.500	0	0	0	NR	NR	0
<b>ADDITIONAL ENVIRONMENTAL RECORDS</b>								
<b>Local Brownfield lists</b>								
US BROWNFIELDS		0.500	0	0	0	NR	NR	0
<b>Local Lists of Landfill / Solid Waste Disposal Sites</b>								
DEBRIS REGION 9		0.500	0	0	0	NR	NR	0
ODI		0.500	0	0	0	NR	NR	0
WMUDS/SWAT		0.500	0	0	0	NR	NR	0
SWRCY		0.500	0	0	0	NR	NR	0
HAULERS		TP	NR	NR	NR	NR	NR	0
INDIAN ODI		0.500	0	0	0	NR	NR	0
<b>Local Lists of Hazardous waste / Contaminated Sites</b>								
US CDL		TP	NR	NR	NR	NR	NR	0
HIST Cal-Sites		1.000	0	0	0	0	NR	0
SCH		0.250	0	0	NR	NR	NR	0
Toxic Pits		1.000	0	0	0	0	NR	0
CDL		TP	NR	NR	NR	NR	NR	0
US HIST CDL		TP	NR	NR	NR	NR	NR	0
<b>Local Lists of Registered Storage Tanks</b>								
CA FID UST		0.250	0	0	NR	NR	NR	0
HIST UST	X	0.250	0	0	NR	NR	NR	0
SWEEPS UST		0.250	0	0	NR	NR	NR	0
<b>Local Land Records</b>								
LIENS 2		TP	NR	NR	NR	NR	NR	0
LUCIS		0.500	0	0	0	NR	NR	0
LIENS		TP	NR	NR	NR	NR	NR	0
DEED		0.500	0	0	0	NR	NR	0
<b>Records of Emergency Release Reports</b>								
HMIRS		TP	NR	NR	NR	NR	NR	0
CHMIRS		TP	NR	NR	NR	NR	NR	0
LDS		TP	NR	NR	NR	NR	NR	0

## MAP FINDINGS SUMMARY

Database	Target Property	Search Distance (Miles)	< 1/8	1/8 - 1/4	1/4 - 1/2	1/2 - 1	> 1	Total Plotted
MCS		TP	NR	NR	NR	NR	NR	0
<b>Other Ascertainable Records</b>								
RCRA-NonGen		0.250	0	0	NR	NR	NR	0
DOT OPS		TP	NR	NR	NR	NR	NR	0
DOD		1.000	1	0	0	0	NR	1
FUDS	X	1.000	0	0	0	0	NR	0
CONSENT		1.000	0	0	0	0	NR	0
ROD		1.000	0	0	0	1	NR	1
UMTRA		0.500	0	0	0	NR	NR	0
MINES		0.250	0	0	NR	NR	NR	0
TRIS		TP	NR	NR	NR	NR	NR	0
TSCA		TP	NR	NR	NR	NR	NR	0
FTTS		TP	NR	NR	NR	NR	NR	0
HIST FTTS		TP	NR	NR	NR	NR	NR	0
SSTS		TP	NR	NR	NR	NR	NR	0
ICIS		TP	NR	NR	NR	NR	NR	0
PADS		TP	NR	NR	NR	NR	NR	0
MLTS		TP	NR	NR	NR	NR	NR	0
RADINFO		TP	NR	NR	NR	NR	NR	0
FINDS		TP	NR	NR	NR	NR	NR	0
RAATS		TP	NR	NR	NR	NR	NR	0
CA BOND EXP. PLAN		1.000	0	0	0	0	NR	0
CA WDS		TP	NR	NR	NR	NR	NR	0
NPDES		TP	NR	NR	NR	NR	NR	0
Cortese		0.500	0	0	0	NR	NR	0
HIST CORTESE		0.500	0	0	0	NR	NR	0
Notify 65		1.000	0	0	0	0	NR	0
DRYCLEANERS		0.250	0	0	NR	NR	NR	0
WIP		0.250	0	0	NR	NR	NR	0
HAZNET		TP	NR	NR	NR	NR	NR	0
EMI		TP	NR	NR	NR	NR	NR	0
INDIAN RESERV		1.000	0	0	0	0	NR	0
SCRD DRYCLEANERS		0.500	0	0	0	NR	NR	0
FINANCIAL ASSURANCE		TP	NR	NR	NR	NR	NR	0
HWP		1.000	0	0	0	0	NR	0
HWT		0.250	0	0	NR	NR	NR	0
COAL ASH EPA		0.500	0	0	0	NR	NR	0
PCB TRANSFORMER		TP	NR	NR	NR	NR	NR	0
COAL ASH DOE		TP	NR	NR	NR	NR	NR	0
MWMP		0.250	0	0	NR	NR	NR	0
PROC		0.500	0	0	0	NR	NR	0

### EDR PROPRIETARY RECORDS

#### **EDR Proprietary Records**

Manufactured Gas Plants	1.000	0	0	0	0	NR	0
EDR Historical Auto Stations	0.250	0	0	NR	NR	NR	0
EDR Historical Cleaners	0.250	0	0	NR	NR	NR	0

#### NOTES:

TP = Target Property

NR = Not Requested at this Search Distance

Sites may be listed in more than one database



Map ID  
Direction  
Distance  
Elevation

MAP FINDINGS

Site

Database(s)

EDR ID Number  
EPA ID Number

A1 YERBA BUENA ISLAND  
Target  
Property SAN FRANCISCO, CA

FUDS 1007211910  
N/A

Site 1 of 5 in cluster A

Actual:  
34 ft.

FUDS:  
Federal Facility ID: CA9799F5906  
FUDS #: J09CA1005  
INST ID: 61316  
Facility Name: Yerba Buena Island  
City: SAN FRANCISCO  
State: CA  
EPA Region: 9  
County: SAN FRANCISCO  
Congressional District: 08  
US Army District: Sacramento District (SPK)  
Fiscal Year: 2008  
Telephone: 916-557-7461  
NPL Status: Not Listed  
RAB: Not reported  
CTC: 317.9  
Current Owner: FEDERAL

FUDS Description Details:

The 361.16-acre site is an island located in the San Francisco Bay at the middle of the San Francisco-Oakland Bay Bridge, in San Francisco County, California. Currently, the Coast Guard uses 10.917 acres of land and the Department of the Navy control is the remaining 350.243 acres. The site consists of housing areas, administrative buildings, a gas station, paint shops, small-arms magazines, a transformer house, and various other structures.

FUDS History Details:

On 6 November 1850, the site was set aside for public purposes. An Executive Order, dated 1 July 1864, set the property aside for military purposes. In 1896, 99.09 acres of hard land were acquired by the Department of the Navy to establish a naval training station. In 1887, 172.20 acres of tide and submerged land were also acquired by the Navy. Between the years of 1938 and 1966, 89.37 additional acres were acquired by the Navy. In 1966, 2.71 acres were transferred from the Navy to the Coast Guard for use as a Coast Guard station. In 1974, an additional 8.207 acres were transferred to the Coast Guard, for a total of 10.917 acres of land disposed. Three underground storage tanks (USTs) and associated piping are currently located on site. The 10.917 acres formerly used by the Department of the Navy are eligible for funding under the FUDS program, but the 350.243 acres currently in possession by the Navy are not.

FUDS Current Program Details:

FUDS Future Program Details:

Map ID  
Direction  
Distance  
Elevation

MAP FINDINGS

Site

Database(s)

EDR ID Number  
EPA ID Number

A2 YERBA BUENA ISLAND GROUP SAN FRANCISCO  
Target YERBA BUENA ISLAND GROUP SAN FRANCISCO  
Property SAN FRANCISCO, CA

ERNS 96508190  
N/A

Site 2 of 5 in cluster A

Actual:  
34 ft.

[Click this hyperlink](#) while viewing on your computer to access  
additional ERNS detail in the EDR Site Report.

A3 YERBA BUENA ISLAND STATION FLOATING DOCKS  
Target YERBA BUENA ISLAND STATION FLOATING DOCKS  
Property SAN FRANCISCO, CA 94130

ERNS 96492266  
N/A

Site 3 of 5 in cluster A

Actual:  
34 ft.

[Click this hyperlink](#) while viewing on your computer to access  
additional ERNS detail in the EDR Site Report.

A4 YERBA BUENA ISLAND PROPERTY (J09CA1005)  
Target  
Property SAN FRANCISCO, CA

ENVIROSTOR S107737649  
N/A

Site 4 of 5 in cluster A

Actual:  
34 ft.

ENVIROSTOR:

Site Type: Military Evaluation  
Site Type Detailed: FUDS  
Acres: 10.917  
NPL: NO  
Regulatory Agencies: SMBRP  
Lead Agency: NONE SPECIFIED  
Program Manager: Not reported  
Supervisor: Donn Diebert  
Division Branch: Sacramento  
Facility ID: 80000780  
Site Code: 201799  
Assembly: 13  
Senate: 03  
Special Program: Not reported  
Status: Inactive - Needs Evaluation  
Status Date: 2005-07-01 00:00:00  
Restricted Use: NO  
Site Mgmt. Req.: NONE SPECIFIED  
Funding: DERA  
Latitude: 37.811388888889  
Longitude: -122.361944444444  
APN: NONE SPECIFIED  
Past Use: NONE SPECIFIED  
Potential COC: NONE SPECIFIED  
Confirmed COC: NONE SPECIFIED  
Potential Description: NONE SPECIFIED  
Alias Name: J09CA1005  
Alias Type: Federal Facility ID  
Alias Name: 201799  
Alias Type: Project Code (Site Code)  
Alias Name: CA99799F590600  
Alias Type: Federal Facility ID  
Alias Name: 80000780  
Alias Type: Envirostor ID Number

Map ID  
Direction  
Distance  
Elevation

MAP FINDINGS

Site

Database(s)

EDR ID Number  
EPA ID Number

YERBA BUENA ISLAND PROPERTY (J09CA1005) (Continued)

S107737649

Completed Info:

Completed Area Name: Not reported  
Completed Sub Area Name: Not reported  
Completed Document Type: Not reported  
Completed Date: Not reported  
Comments: Not reported

Future Area Name: Not reported  
Future Sub Area Name: Not reported  
Future Document Type: Not reported  
Future Due Date: Not reported  
Schedule Area Name: Not reported  
Schedule Sub Area Name: Not reported  
Schedule Document Type: Not reported  
Schedule Due Date: Not reported  
Schedule Revised Date: Not reported

A5 YERBA BUENA WEST  
Target 150 4TH ST  
Property SAN FRANCISCO, CA 94103

HIST UST U001595138  
N/A

Site 5 of 5 in cluster A

Actual:  
34 ft.

HIST UST:

Region: STATE  
Facility ID: 00000040335  
Facility Type: Other  
Other Type: OFFICE  
Total Tanks: 0001  
Contact Name: MARLENE MCCOY  
Telephone: 4154953433  
Owner Name: YERBA BUENA WEST  
Owner Address: 150 FOURTH STREET, SUITE 222  
Owner City,St,Zip: SAN FRANCISCO, CA 94103

Tank Num: 001  
Container Num: 181589  
Year Installed: 1982  
Tank Capacity: 00001000  
Tank Used for: PRODUCT  
Type of Fuel: DIESEL  
Tank Construction: 10 gauge  
Leak Detection: Visual

DOD  
Region

TREASURE ISLAND NAVAL BASE (CLOSED)

DOD CUSA136079  
N/A

TREASURE ISLAND NAVAL BAS (County), CA

< 1/8  
1 ft.

DOD:

Feature 1: Navy DOD  
Feature 2: Not reported  
Feature 3: Not reported  
URL: Not reported  
Name 1: Treasure Island Naval Base (Closed)



Map ID  
Direction  
Distance  
Elevation

MAP FINDINGS

Site

Database(s)

EDR ID Number  
EPA ID Number

**TREASURE ISLAND NAVAL BASE (CLOSED) (Continued)**

**CUSA136079**

Name 2: Not reported  
Name 3: Not reported  
State: CA  
DOD Site: Yes  
Tile name: CASAN\_FRANCISCO

**6  
NW  
1/2-1  
0.890 mi.  
4698 ft.**

**FORMER NAVAL STATION, TREASURE ISLAND  
TREASURE ISL  
SAN FRANCISCO, CA 94130**

**CERCLIS 1000158378  
RCRA-LQG CA7170023330  
ROD  
NPDES  
MANIFEST  
HAZNET**

**Relative:  
Lower**

CERCLIS:  
Site ID: 0902776  
Federal Facility: Federal Facility  
NPL Status: Not on the NPL  
Non NPL Status: Other Cleanup Activity: Federal Facility-Lead Cleanup

**Actual:  
7 ft.**

**CERCLIS Site Contact Name(s):**

Contact Name: Christine Katin  
Contact Tel: (415) 972-3112  
Contact Title: Remedial Project Manager (RPM)

Contact Name: Karen Jurist  
Contact Tel: (415) 972-3219  
Contact Title: Site Assessment Manager (SAM)

Contact Name: Jeff Inglis  
Contact Tel: (415) 972-3095  
Contact Title: Site Assessment Manager (SAM)

Contact Name: Carl Brickner  
Contact Tel: (415) 972-3814  
Contact Title: Site Assessment Manager (SAM)

**CERCLIS Site Alias Name(s):**

Alias Name: NAVAL STATION TREASURE ISL  
Alias Address: Not reported  
CA

Alias Name: TREASURE ISLAND NAVAL STATION  
Alias Address: TREASURE ISLAND  
SAN FRANCISCO, CA 92278

Site Description: Hunters Point was first developed for dry dock use in 1867. The Navy acquired title to the land in 1940 and began developing the area for various shipyard activities. In 1942, the Navy began using HPA for shipbuilding, repair, and maintenance. From 1945 to 1974, the shipyard was primarily used as a repair facility by the Navy. The Navy discontinued activities at HPA in 1974. From 1976 to 1986, the Navy leased 98 percent of HPA, including all of Parcel A, to the Triple A Machine Shop (Triple A), a private ship repair company. In 1986, the Navy reoccupied the property. Currently, portions of Parcel A are subleased for use as artists' studios. Throughout its history, both the Navy and Triple A used Parcel A primarily for residential purposes. In addition, the Navy used on building on Parcel A as a radiation laboratory. Most of the other structures were used as offices and warehouses. Currently, approximately 61 buildings are located on the property, 45 of which are former residences. In addition, the foundations of 43 other structures are located on Parcel

Map ID  
Direction  
Distance  
Elevation

MAP FINDINGS

Site

Database(s)

EDR ID Number  
EPA ID Number

**FORMER NAVAL STATION, TREASURE ISLAND (Continued)**

**1000158378**

A. The Navy began environmental studies at HPA in 1984 under the U.S. Department of Defense's Installation Restoration Program. Between 1984 and 1991, the Navy performed a series of installation-wide investigations to identify potential source areas of contamination and to investigate air quality (WESTEC Services, Inc. 1984; Aqua Terra Technologies [ATT] 1987; EMCON Associates 1987; Environmental Resources Management, West 1988; YEI Engineering, Inc. 1988a and 1988b; Harding Lawson Associates [HLA] 1992; Brown & Caldwell 1995). In addition, the Navy conducted investigations in discrete areas of Parcel A (HLA 1987 and 1988; ATT 1987). In 1989, EPA added HPA to the NPL. In 1990, the Navy, EPA Region IX, and the State of California entered into a Federal Facilities Agreement (FFA) to coordinate environmental activities at HPA. In 1991, the U.S. Department of Defense designated HPA for closure as an active military base under its BRAC program. As the first phase in the CERCLA process, the Navy conducted a preliminary assessment/site inspection (PA/SI) of seven potential source areas identified during the Navy's previous investigations. Site-specific histories of each of these areas, referred to as SI sites, are provided. As SI was performed on each site in 1993 (PRC and HLA 1993). The Navy concluded that no further action was required at the seven SI sites because the sites do not pose a risk to human health and the environment. The EPA and Cal/EPA concurred that no action is required at these sites. HPA is located on a promontory in southeast San Francisco. The promontory is bounded on the north and east by the San Francisco Bay and on the south and west by the Bayview-Hunters Point district of the city of San Francisco. The entire HPA covers 936 acres, 493 of which are on land and 443 of which are under water. To facilitate the environmental investigation and remediation, and ultimate transfer of the property, HPA was divided into several parcels (Parcels A through F). This ROD address the remedy for sites at Parcel A. Parcel A----- Parcel is bounded by the portions of HPA and the Bayview-Hunters Point district. Parcel A covers approximately 88 acres. Land to the northwest of Parcel A is used for residential purposes. The other HPA parcels that bound Parcel A are currently undergoing investigation and remediation for future redevelopment. Under the local reuse authority's current land-use plan, those parcels will ultimately be used primarily for commercial and industrial purposes, whereas Parcel A will be used for residential as well as for light commercial purposes. Parcel A consists of the upland area of HPA and a portion of the lowlands. Ground surface elevations at Parcel A range from 0 to 18 feet above mean sea level (msl) in the lowlands to 180 feet above msl at the ridge crest. The peninsula forming HPA is within a northwest-trending belt of Franciscan bedrock. Bedrock is present at the ground surface over most of Parcel A. In localized areas, the bedrock is overlain by fill material. There is evidence of past landslides on Parcel A. No wetlands or surface water are located at Parcel A. Limited quantities of groundwater are present in localized fractures of the bedrock. However, parcel A groundwater is not suitable as a potential source of drinking water because of low well yield. Groundwater from the bedrock discharges through springs and seeps along Parcel A slopes. No underground storage tanks (UST), aboveground tanks, drums, or hazardous materials storage areas remain on Parcel A. Sewer lines, storm drains, and steam lines located in Parcel A were included in the early investigations of the property, which found no further investigation was required. The site is making progress according to appropriate cleanup standards, according to the RPM, Christine Katin.

**CERCLIS Assessment History:**

Action:	DISCOVERY
Date Started:	Not reported
Date Completed:	07/01/80
Priority Level:	Not reported

Map ID  
Direction  
Distance  
Elevation

MAP FINDINGS

Site

Database(s)

EDR ID Number  
EPA ID Number

**FORMER NAVAL STATION, TREASURE ISLAND (Continued)**

**1000158378**

Action: PRELIMINARY ASSESSMENT  
Date Started: Not reported  
Date Completed: 12/27/91  
Priority Level: Higher priority for further assessment

Action: SITE INSPECTION  
Date Started: Not reported  
Date Completed: 12/27/91  
Priority Level: Higher priority for further assessment

Action: SITE REASSESSMENT  
Date Started: 05/13/08  
Date Completed: 05/23/08  
Priority Level: Low priority for further assessment

Action: FEDERAL FACILITY REMEDIAL INVESTIGATION/FEASIBILITY STUDY  
Date Started: 07/12/91  
Date Completed: Not reported  
Priority Level: Not reported

Action: Restoration Advisory Board  
Date Started: 12/01/93  
Date Completed: Not reported  
Priority Level: Not reported

**RCRA-LQG:**

Date form received by agency: 02/24/2006  
Facility name: FORMER NAVAL STATION, TREASURE ISLAND  
Facility address: 410 PALM AVENUE, BLDG. 1  
SAN FRANCISCO, CA 94130  
EPA ID: CA7170023330  
Mailing address: ROICC SAN FRANCISCO BAY AREA  
2450 SARATOGA ST., SUITE 200  
ALAMEDA, CA 94501  
Contact: SHIRLEY S NG  
Contact address: Not reported  
Not reported  
Contact country: Not reported  
Contact telephone: (510) 749-5939  
Contact email: SHIRLEY.NG@NAVY.MIL  
EPA Region: 09  
Land type: Federal  
Classification: Large Quantity Generator  
Description: Handler: generates 1,000 kg or more of hazardous waste during any calendar month; or generates more than 1 kg of acutely hazardous waste during any calendar month; or generates more than 100 kg of any residue or contaminated soil, waste or other debris resulting from the cleanup of a spill, into or on any land or water, of acutely hazardous waste during any calendar month; or generates 1 kg or less of acutely hazardous waste during any calendar month, and accumulates more than 1 kg of acutely hazardous waste at any time; or generates 100 kg or less of any residue or contaminated soil, waste or other debris resulting from the cleanup of a spill, into or on any land or water, of acutely hazardous waste during any calendar month, and accumulates more than 100 kg of that material at any time



Map ID  
Direction  
Distance  
Elevation

MAP FINDINGS

Site

Database(s)

EDR ID Number  
EPA ID Number

FORMER NAVAL STATION, TREASURE ISLAND (Continued)

1000158378

Owner/Operator Summary:

Owner/operator name: U.S. NAVY  
Owner/operator address: Not reported  
Not reported  
Owner/operator country: US  
Owner/operator telephone: Not reported  
Legal status: Federal  
Owner/Operator Type: Operator  
Owner/Op start date: 01/01/1941  
Owner/Op end date: Not reported

Owner/operator name: U.S. NAVY  
Owner/operator address: 410 PALM AVE B-1, STE 161  
SAN FRANCISCO, CA 94130  
Owner/operator country: US  
Owner/operator telephone: Not reported  
Legal status: Federal  
Owner/Operator Type: Owner  
Owner/Op start date: 01/01/1940  
Owner/Op end date: Not reported

Handler Activities Summary:

U.S. importer of hazardous waste: No  
Mixed waste (haz. and radioactive): No  
Recycler of hazardous waste: No  
Transporter of hazardous waste: No  
Treater, storer or disposer of HW: No  
Underground injection activity: No  
On-site burner exemption: No  
Furnace exemption: No  
Used oil fuel burner: No  
Used oil processor: No  
Used oil refiner: No  
Used oil fuel marketer to burner: No  
Used oil Specification marketer: No  
Used oil transfer facility: No  
Used oil transporter: No  
Off-site waste receiver: Commercial status unknown

Universal Waste Summary:

Waste type: Batteries  
Accumulated waste on-site: No  
Generated waste on-site: No

Waste type: Lamps  
Accumulated waste on-site: No  
Generated waste on-site: No

Waste type: Pesticides  
Accumulated waste on-site: No  
Generated waste on-site: No

Waste type: Thermostats  
Accumulated waste on-site: No  
Generated waste on-site: No

Map ID  
Direction  
Distance  
Elevation

MAP FINDINGS

Site

Database(s)

EDR ID Number  
EPA ID Number

**FORMER NAVAL STATION, TREASURE ISLAND (Continued)**

**1000158378**

**Historical Generators:**

Date form received by agency: 02/23/2004

Facility name: FORMER NAVAL STATION, TREASURE ISLAND  
Site name: FORMER NAVAL STATION TREASURE ISLAND  
Classification: Large Quantity Generator

Date form received by agency: 02/12/2002

Facility name: FORMER NAVAL STATION, TREASURE ISLAND  
Site name: USNAVY FORMER NAVAL STATION TREASURE ISL  
Classification: Large Quantity Generator

Date form received by agency: 10/12/2000

Facility name: FORMER NAVAL STATION, TREASURE ISLAND  
Site name: CARETAKER SITE OFFICE TREASURE ISLAND  
Classification: Large Quantity Generator

Date form received by agency: 03/04/1999

Facility name: FORMER NAVAL STATION, TREASURE ISLAND  
Site name: CARETAKER SITE OFFICE TREASURE ISLAND  
Classification: Large Quantity Generator

Date form received by agency: 09/01/1996

Facility name: FORMER NAVAL STATION, TREASURE ISLAND  
Site name: USNAVY TREASURE ISLAND NAVAL STATION  
Classification: Large Quantity Generator

Date form received by agency: 04/23/1996

Facility name: FORMER NAVAL STATION, TREASURE ISLAND  
Site name: NAVAL STATION TREASURE ISLAND  
Classification: Large Quantity Generator

Date form received by agency: 06/27/1994

Facility name: FORMER NAVAL STATION, TREASURE ISLAND  
Site name: NAVAL STATION TREASURE ISLAND  
Classification: Large Quantity Generator

Date form received by agency: 03/24/1992

Facility name: FORMER NAVAL STATION, TREASURE ISLAND  
Site name: NAVAL STATION - TREASURE ISLAN  
Classification: Large Quantity Generator

Date form received by agency: 04/26/1990

Facility name: FORMER NAVAL STATION, TREASURE ISLAND  
Site name: NAVAL STATION - TREASURE ISLAND  
Classification: Large Quantity Generator

Date form received by agency: 07/16/1980

Facility name: FORMER NAVAL STATION, TREASURE ISLAND  
Site name: USNAVY TREASURE ISLAND NAVAL STATION  
Classification: Large Quantity Generator

**Hazardous Waste Summary:**

Waste code: 181

Waste name: 181

Waste code: 331

Map ID  
Direction  
Distance  
Elevation

MAP FINDINGS

Site

Database(s)

EDR ID Number  
EPA ID Number

FORMER NAVAL STATION, TREASURE ISLAND (Continued)

1000158378

Waste name: 331

Waste code: 611

Waste name: 611

Waste code: D001

Waste name: IGNITABLE HAZARDOUS WASTES ARE THOSE WASTES WHICH HAVE A FLASHPOINT OF LESS THAN 140 DEGREES FAHRENHEIT AS DETERMINED BY A PENSKEY-MARTENS CLOSED CUP FLASH POINT TESTER. ANOTHER METHOD OF DETERMINING THE FLASH POINT OF A WASTE IS TO REVIEW THE MATERIAL SAFETY DATA SHEET, WHICH CAN BE OBTAINED FROM THE MANUFACTURER OR DISTRIBUTOR OF THE MATERIAL. LACQUER THINNER IS AN EXAMPLE OF A COMMONLY USED SOLVENT WHICH WOULD BE CONSIDERED AS IGNITABLE HAZARDOUS WASTE.

Waste code: D008

Waste name: LEAD

Waste code: F002

Waste name: THE FOLLOWING SPENT HALOGENATED SOLVENTS: TETRACHLOROETHYLENE, METHYLENE CHLORIDE, TRICHLOROETHYLENE, 1,1,1-TRICHLOROETHANE, CHLOROBENZENE, 1,1,2-TRICHLORO-1,2,2-TRIFLUOROETHANE, ORTHO-DICHLOROBENZENE, TRICHLOROFLUOROMETHANE, AND 1,1,2-TRICHLOROETHANE; ALL SPENT SOLVENT MIXTURES/BLENDS CONTAINING, BEFORE USE, A TOTAL OF TEN PERCENT OR MORE (BY VOLUME) OF ONE OR MORE OF THE ABOVE HALOGENATED SOLVENTS OR THOSE LISTED IN F001, F004, OR F005, AND STILL BOTTOMS FROM THE RECOVERY OF THESE SPENT SOLVENTS AND SPENT SOLVENT MIXTURES.

Facility Has Received Notices of Violations:

Regulation violated: Not reported  
Area of violation: Generators - General  
Date violation determined: 03/08/1995  
Date achieved compliance: 06/19/1995  
Violation lead agency: State  
Enforcement action: WRITTEN INFORMAL  
Enforcement action date: 03/09/1995  
Enf. disposition status: Not reported  
Enf. disp. status date: Not reported  
Enforcement lead agency: State  
Proposed penalty amount: Not reported  
Final penalty amount: Not reported  
Paid penalty amount: Not reported

Regulation violated: Not reported  
Area of violation: Generators - Pre-transport  
Date violation determined: 03/08/1995  
Date achieved compliance: 06/19/1995  
Violation lead agency: State  
Enforcement action: WRITTEN INFORMAL  
Enforcement action date: 03/09/1995  
Enf. disposition status: Not reported  
Enf. disp. status date: Not reported  
Enforcement lead agency: State  
Proposed penalty amount: Not reported  
Final penalty amount: Not reported  
Paid penalty amount: Not reported



Map ID  
Direction  
Distance  
Elevation

MAP FINDINGS

Site

Database(s)

EDR ID Number  
EPA ID Number

**FORMER NAVAL STATION, TREASURE ISLAND (Continued)**

**1000158378**

Regulation violated: Not reported  
Area of violation: Generators - Pre-transport  
Date violation determined: 03/08/1993  
Date achieved compliance: 03/08/1993  
Violation lead agency: EPA  
Enforcement action: WRITTEN INFORMAL  
Enforcement action date: 03/08/1993  
Enf. disposition status: Not reported  
Enf. disp. status date: Not reported  
Enforcement lead agency: EPA  
Proposed penalty amount: Not reported  
Final penalty amount: Not reported  
Paid penalty amount: Not reported

Regulation violated: Not reported  
Area of violation: Generators - General  
Date violation determined: 03/08/1993  
Date achieved compliance: 03/08/1993  
Violation lead agency: EPA  
Enforcement action: WRITTEN INFORMAL  
Enforcement action date: 03/08/1993  
Enf. disposition status: Not reported  
Enf. disp. status date: Not reported  
Enforcement lead agency: EPA  
Proposed penalty amount: Not reported  
Final penalty amount: Not reported  
Paid penalty amount: Not reported

Regulation violated: Not reported  
Area of violation: Generators - General  
Date violation determined: 11/16/1987  
Date achieved compliance: 08/28/1989  
Violation lead agency: State  
Enforcement action: WRITTEN INFORMAL  
Enforcement action date: 04/15/1988  
Enf. disposition status: Not reported  
Enf. disp. status date: Not reported  
Enforcement lead agency: State  
Proposed penalty amount: Not reported  
Final penalty amount: Not reported  
Paid penalty amount: Not reported

Regulation violated: Not reported  
Area of violation: LDR - General  
Date violation determined: 11/16/1987  
Date achieved compliance: 08/28/1989  
Violation lead agency: State  
Enforcement action: WRITTEN INFORMAL  
Enforcement action date: 04/15/1988  
Enf. disposition status: Not reported  
Enf. disp. status date: Not reported  
Enforcement lead agency: State  
Proposed penalty amount: Not reported  
Final penalty amount: Not reported  
Paid penalty amount: Not reported

Regulation violated: Not reported

Map ID  
Direction  
Distance  
Elevation

Site

MAP FINDINGS

Database(s)  
EDR ID Number  
EPA ID Number

FORMER NAVAL STATION, TREASURE ISLAND (Continued)

1000158378

Area of violation: Generators - Manifest  
Date violation determined: 11/16/1987  
Date achieved compliance: 08/28/1989  
Violation lead agency: State  
Enforcement action: WRITTEN INFORMAL  
Enforcement action date: 04/15/1988  
Enf. disposition status: Not reported  
Enf. disp. status date: Not reported  
Enforcement lead agency: State  
Proposed penalty amount: Not reported  
Final penalty amount: Not reported  
Paid penalty amount: Not reported

Evaluation Action Summary:

Evaluation date: 03/07/1995  
Evaluation: COMPLIANCE EVALUATION INSPECTION ON-SITE  
Area of violation: Generators - General  
Date achieved compliance: 06/19/1995  
Evaluation lead agency: State

Evaluation date: 03/07/1995  
Evaluation: COMPLIANCE EVALUATION INSPECTION ON-SITE  
Area of violation: Generators - Pre-transport  
Date achieved compliance: 06/19/1995  
Evaluation lead agency: State

Evaluation date: 01/27/1993  
Evaluation: COMPLIANCE EVALUATION INSPECTION ON-SITE  
Area of violation: Generators - Pre-transport  
Date achieved compliance: 03/08/1993  
Evaluation lead agency: EPA

Evaluation date: 01/27/1993  
Evaluation: COMPLIANCE EVALUATION INSPECTION ON-SITE  
Area of violation: Generators - General  
Date achieved compliance: 03/08/1993  
Evaluation lead agency: EPA

Evaluation date: 11/16/1987  
Evaluation: COMPLIANCE EVALUATION INSPECTION ON-SITE  
Area of violation: Generators - Manifest  
Date achieved compliance: 08/28/1989  
Evaluation lead agency: State

Evaluation date: 11/16/1987  
Evaluation: FOCUSED COMPLIANCE INSPECTION  
Area of violation: LDR - General  
Date achieved compliance: 08/28/1989  
Evaluation lead agency: State

Evaluation date: 11/16/1987  
Evaluation: COMPLIANCE EVALUATION INSPECTION ON-SITE  
Area of violation: Generators - General  
Date achieved compliance: 08/28/1989  
Evaluation lead agency: State

ROD:

Map ID  
Direction  
Distance  
Elevation

MAP FINDINGS

Site

Database(s)

EDR ID Number  
EPA ID Number

FORMER NAVAL STATION, TREASURE ISLAND (Continued)

1000158378

Full-text of USEPA Record of Decision(s) is available from EDR.

NPDES:

Npdes Number:	Not reported
Facility Status:	Active
Agency Id:	10323
Region:	2
Regulatory Measure Id:	182593
Order No:	97-03-DWQ
Regulatory Measure Type:	Storm water industrial
Place Id:	243992
WDID:	2 381012140
Program Type:	INDSTW
Adoption Date Of Regulatory Measure:	Not reported
Effective Date Of Regulatory Measure:	2/7/1996
Expiration Date Of Regulatory Measure:	Not reported
Termination Date Of Regulatory Measure:	Not reported
Discharge Name:	US Navy Caretaker Site Office
Discharge Address:	410 Palm Ave Bldg 1
Discharge City:	San Francisco
Discharge State:	CA
Discharge Zip:	94130

NY MANIFEST:

EPA ID:	CA7170023330
Country:	USA
Mailing Name:	UNITED STATES MILITARY
Mailing Contact:	EDDIE SARMIENTO
Mailing Address:	NAVAL STATION TREASURE ISLAND
Mailing Address 2:	Not reported
Mailing City:	SAN FRANCISCO
Mailing State:	CA
Mailing Zip:	94130
Mailing Zip4:	Not reported
Mailing Country:	USA
Mailing Phone:	415-395-5452

Document ID:	NYB4414527
Manifest Status:	Completed copy
Trans1 State ID:	10222PNY
Trans2 State ID:	Not reported
Generator Ship Date:	930125
Trans1 Recv Date:	930125
Trans2 Recv Date:	Not reported
TSD Site Recv Date:	930209
Part A Recv Date:	930210
Part B Recv Date:	930218
Generator EPA ID:	CA7170023330
Trans1 EPA ID:	NYD980769947
Trans2 EPA ID:	Not reported
TSDF ID:	NYD000632372
Waste Code:	D001 - NON-LISTED IGNITABLE WASTES
Quantity:	00010
Units:	P - Pounds
Number of Containers:	001



Map ID  
Direction  
Distance  
Elevation

MAP FINDINGS

Site

Database(s)

EDR ID Number  
EPA ID Number

FORMER NAVAL STATION, TREASURE ISLAND (Continued)

1000158378

Container Type: DM - Metal drums, barrels  
Handling Method: B Incineration, heat recovery, burning.  
Specific Gravity: Not reported  
Year: 93  
Manifest Tracking Num: Not reported  
Import Ind: Not reported  
Export Ind: Not reported  
Discr Quantity Ind: Not reported  
Discr Type Ind: Not reported  
Discr Residue Ind: Not reported  
Discr Partial Reject Ind: Not reported  
Discr Full Reject Ind: Not reported  
Manifest Ref Num: Not reported  
Alt Fac RCRA Id: Not reported  
Alt Fac Sign Date: Not reported  
Mgmt Method Type Code: Not reported

HAZNET:

Gepaid: CA7170023330  
Contact: MICHAEL MENTINK ENVIRONMENTAL  
Telephone: 4157434729  
Facility Addr2: Not reported  
Mailing Name: Not reported  
Mailing Address: 410 PALM AVE B-1 STE 161  
Mailing City,St,Zip: SAN FRANCISCO, CA 941301806  
Gen County: San Francisco  
TSD EPA ID: CAD059494310  
TSD County: Santa Clara  
Waste Category: Off-specification, aged, or surplus organics  
Disposal Method: Disposal, Other  
Tons: Not reported  
Facility County: Not reported

Gepaid: CA7170023330  
Contact: MICHAEL MENTINK ENVIRONMENTAL  
Telephone: 4157434729  
Facility Addr2: Not reported  
Mailing Name: Not reported  
Mailing Address: 410 PALM AVE B-1 STE 161  
Mailing City,St,Zip: SAN FRANCISCO, CA 941301806  
Gen County: San Francisco  
TSD EPA ID: CAD097030993  
TSD County: Los Angeles  
Waste Category: Other organic solids  
Disposal Method: H141  
Tons: 1.1  
Facility County: San Francisco

Gepaid: CA7170023330  
Contact: MICHAEL MENTINK ENVIRONMENTAL  
Telephone: 4157434729  
Facility Addr2: Not reported  
Mailing Name: Not reported  
Mailing Address: 410 PALM AVE B-1 STE 161  
Mailing City,St,Zip: SAN FRANCISCO, CA 941301806  
Gen County: San Francisco  
TSD EPA ID: CAD097030993

Map ID  
Direction  
Distance  
Elevation

MAP FINDINGS

Site

Database(s)

EDR ID Number  
EPA ID Number

**FORMER NAVAL STATION, TREASURE ISLAND (Continued)**

**1000158378**

TSD County: Los Angeles  
Waste Category: Not reported  
Disposal Method: Not reported  
Tons: Not reported  
Facility County: San Francisco

Gepaid: CA7170023330  
Contact: MICHAEL MENTINK ENVIRONMENTAL  
Telephone: 4157434729  
Facility Addr2: Not reported  
Mailing Name: Not reported  
Mailing Address: 410 PALM AVE B-1 STE 161  
Mailing City,St,Zip: SAN FRANCISCO, CA 941301806  
Gen County: San Francisco  
TSD EPA ID: IDD073114654  
TSD County: 99  
Waste Category: Contaminated soil from site clean-ups  
Disposal Method: H132  
Tons: 15.95  
Facility County: San Francisco

Gepaid: CA7170023330  
Contact: MICHAEL MENTINK ENVIRONMENTAL  
Telephone: 4157434729  
Facility Addr2: Not reported  
Mailing Name: Not reported  
Mailing Address: 410 PALM AVE B-1 STE 161  
Mailing City,St,Zip: SAN FRANCISCO, CA 941301806  
Gen County: San Francisco  
TSD EPA ID: CAD008302903  
TSD County: Los Angeles  
Waste Category: Aqueous solution with less than 10% total organic residues  
Disposal Method: H039  
Tons: 0.1  
Facility County: San Francisco

[Click this hyperlink](#) while viewing on your computer to access  
6 additional CA\_HAZNET: record(s) in the EDR Site Report.

## ORPHAN SUMMARY

City	EDR ID	Site Name	Site Address	Zip	Database(s)
SAN FRANCISCO	1001815485	CALTRANS DIST 4	YERBA BUENA ISLAND TUNNEL APPR	94130	RCRA-SQG.FINDS
SAN FRANCISCO	1007298123	US NAVY-NAVAL STATION TREASURE ISL	410 PALM AV CODE 84.1	94130	FTTS,HIST FTTS INSP
SAN FRANCISCO	1008191139	TREASURE ISLAND NAVAL STATION	TREASURE ISLAND NAVAL STATION	94130	HIST FTTS INSP
SAN FRANCISCO	1008250080	TREASURE ISLAND ELEMENTARY	13TH & E STS.	94130	FINDS
SAN FRANCISCO	2007320361	ALCATRAZ ISLAND	ALCATRAZ ISLAND		ERNS
SAN FRANCISCO	2007325998	1 YERBA BUENA ISLAND	1 YERBA BUENA ISLAND	94130	ERNS
SAN FRANCISCO	2007326665	1 YERBA BUENA ISLAND	1 YERBA BUENA ISLAND	94130	ERNS
SAN FRANCISCO	2007330650	1 YERBA BUENA ISLAND	1 YERBA BUENA ISLAND	94130	ERNS
VALLEJO	2007331591	1 YERBA BUENA ISLAND	1 YERBA BUENA ISLAND	94130	ERNS
SAN FRANCISCO	2008888373	1 YERBA BUENA ISLAND	1 YERBA BUENA ISLAND	94130	ERNS
SAN FRANCISCO	2008892503	1 YERBA BUENA ISLAND	1 YERBA BUENA ISLAND	94130	ERNS
SAN FRANCISCO	A100323378		3 TREASURE ISLAND 94130		AST
SAN FRANCISCO	S103966802	GROVER MANAGEMENT & CONSTRUCTION	TREASURE ISLAND BLDG #1	00000	HAZNET,HIST CORTESE
TREASURE ISLAND	S104569808	TREASURE ISLAND JOB CORP	TREASURE ISLAND BLDG #1	94130	HAZNET
SAN FRANCISCO	S104580548	CCSF PUC TREASURE ISLAND WPCP	BUILDING 135	94130	HAZNET
SAN FRANCISCO	S109548298	NAVAL STATION TREASURE ISLAND/SITE	100 M STREET / BLDG 681	94130	AWP,ENVIROSTOR
SAN FRANCISCO	S109548303	NAVAL STATION TREASURE ISLAND/SITE	TREASURE ISLAND, BETWEEN SAN F	94130	AWP,ENVIROSTOR
SAN FRANCISCO	S109548307	NAVAL STATION TREASURE ISLAND/SITE	TREASURE ISLAND, BETWEEN SAN F	94130	AWP,ENVIROSTOR
SAN FRANCISCO	S109548324	NAVAL STATION TREASURE ISLAND/SITE	TREASURE ISLAND, BETWEEN SAN F	94130	AWP,ENVIROSTOR
SAN FRANCISCO	S109548351	NAVAL STATION TREASURE ISLAND/SITE	TREASURE ISLAND, BETWEEN SAN F	94130	AWP,ENVIROSTOR
SAN FRANCISCO	S109548358	NAVAL STATION TREASURE ISLAND/SITE	TREASURE ISLAND, BETWEEN SAN F	94130	AWP,ENVIROSTOR
SAN FRANCISCO	S109548359	NAVAL STATION TREASURE ISLAND/SITE	TREASURE ISLAND, BETWEEN SAN F	94130	AWP,ENVIROSTOR
SAN FRANCISCO	S109548373	NAVAL STATION TREASURE ISLAND/SITE	TREASURE ISLAND, BETWEEN SAN F	94130	AWP,ENVIROSTOR
SAN FRANCISCO	S109548379	NAVAL STATION TREASURE ISLAND/SITE	TREASURE ISLAND, BETWEEN SAN F	94130	AWP,ENVIROSTOR
SAN FRANCISCO	S109611864	NAVAL STATION TREASURE ISLAND/SITE	TREASURE ISLAND, BETWEEN SAN F	94130	AWP,ENVIROSTOR
SAN FRANCISCO	S109611865	NAVAL STATION TREASURE ISLAND/SITE	TREASURE ISLAND, BETWEEN SAN F	94130	AWP,ENVIROSTOR
SAN FRANCISCO	S109611866	NAVAL STATION TREASURE ISLAND/SITE	TREASURE ISLAND, BETWEEN SAN F	94130	CORTESE
SAN FRANCISCO	S109611869	NAVAL STATION TREASURE ISLAND/SITE	TREASURE ISLAND, BETWEEN SAN F	94130	CORTESE
SAN FRANCISCO	S109611870	NAVAL STATION TREASURE ISLAND/SITE	TREASURE ISLAND, BETWEEN SAN F	94130	CORTESE
SAN FRANCISCO	S109611871	NAVAL STATION TREASURE ISLAND/SITE	TREASURE ISLAND, BETWEEN SAN F	94130	CORTESE
SAN FRANCISCO	S109611872	NAVAL STATION TREASURE ISLAND/SITE	TREASURE ISLAND, BETWEEN SAN F	94130	CORTESE
SAN FRANCISCO	S109611873	NAVAL STATION TREASURE ISLAND/SITE	TREASURE ISLAND, BETWEEN SAN F	94130	CORTESE
SAN FRANCISCO	S109611874	NAVAL STATION TREASURE ISLAND/SITE	TREASURE ISLAND, BETWEEN SAN F	94130	CORTESE
SAN FRANCISCO	S109851013	NAVAL STATION TREASURE ISLAND/SITE	TREASURE ISLAND, BETWEEN SAN F	94130	CORTESE
SAN FRANCISCO	S109851014	NAVAL STATION TREASURE ISLAND/SITE	TREASURE ISLAND, BETWEEN SAN F	94130	CORTESE
SAN FRANCISCO	S109851015	NAVAL STATION TREASURE ISLAND/SITE	TREASURE ISLAND, BETWEEN SAN F	94130	CORTESE
SAN FRANCISCO	S110042429	NAVAL STATION TREASURE ISLAND/SITE	TREASURE ISLAND, BETWEEN SAN F	94130	CORTESE
SAN FRANCISCO	S110042441	NAVAL STATION TREASURE ISLAND/SITE	TREASURE ISLAND, BETWEEN SAN F	94130	CORTESE
SAN FRANCISCO	S110042449	NAVAL STATION TREASURE ISLAND/SITE	TREASURE ISLAND, BETWEEN SAN F	94130	CORTESE
SAN FRANCISCO	U004151060	TYBII/ISLAND CREATIVE MANAGEMENT	TREASURE ISLAND, BETWEEN SAN F	94130	CORTESE
SAN FRANCISCO			2 TREASURE ISLAND (440 CALIF A	94130	CORTESE
				94130	AWP,ENVIROSTOR
				94130	AWP,ENVIROSTOR
				94130	UST ALAMEDA



## GOVERNMENT RECORDS SEARCHED / DATA CURRENCY TRACKING

To maintain currency of the following federal and state databases, EDR contacts the appropriate governmental agency on a monthly or quarterly basis, as required.

**Number of Days to Update:** Provides confirmation that EDR is reporting records that have been updated within 90 days from the date the government agency made the information available to the public.

### STANDARD ENVIRONMENTAL RECORDS

#### ***Federal NPL site list***

##### **NPL: National Priority List**

National Priorities List (Superfund). The NPL is a subset of CERCLIS and identifies over 1,200 sites for priority cleanup under the Superfund Program. NPL sites may encompass relatively large areas. As such, EDR provides polygon coverage for over 1,000 NPL site boundaries produced by EPA's Environmental Photographic Interpretation Center (EPIC) and regional EPA offices.

Date of Government Version: 03/31/2010  
Date Data Arrived at EDR: 04/02/2010  
Date Made Active in Reports: 04/12/2010  
Number of Days to Update: 10

Source: EPA  
Telephone: N/A  
Last EDR Contact: 05/07/2010  
Next Scheduled EDR Contact: 07/26/2010  
Data Release Frequency: Quarterly

##### **NPL Site Boundaries**

###### **Sources:**

EPA's Environmental Photographic Interpretation Center (EPIC)  
Telephone: 202-564-7333

EPA Region 1  
Telephone 617-918-1143

EPA Region 6  
Telephone: 214-655-6659

EPA Region 3  
Telephone 215-814-5418

EPA Region 7  
Telephone: 913-551-7247

EPA Region 4  
Telephone 404-562-8033

EPA Region 8  
Telephone: 303-312-6774

EPA Region 5  
Telephone 312-886-6686

EPA Region 9  
Telephone: 415-947-4246

EPA Region 10  
Telephone 206-553-8665

##### **Proposed NPL: Proposed National Priority List Sites**

A site that has been proposed for listing on the National Priorities List through the issuance of a proposed rule in the Federal Register. EPA then accepts public comments on the site, responds to the comments, and places on the NPL those sites that continue to meet the requirements for listing.

Date of Government Version: 03/31/2010  
Date Data Arrived at EDR: 04/02/2010  
Date Made Active in Reports: 04/12/2010  
Number of Days to Update: 10

Source: EPA  
Telephone: N/A  
Last EDR Contact: 05/07/2010  
Next Scheduled EDR Contact: 07/26/2010  
Data Release Frequency: Quarterly

##### **NPL LIENS: Federal Superfund Liens**

Federal Superfund Liens. Under the authority granted the USEPA by CERCLA of 1980, the USEPA has the authority to file liens against real property in order to recover remedial action expenditures or when the property owner received notification of potential liability. USEPA compiles a listing of filed notices of Superfund Liens.

Date of Government Version: 10/15/1991  
Date Data Arrived at EDR: 02/02/1994  
Date Made Active in Reports: 03/30/1994  
Number of Days to Update: 56

Source: EPA  
Telephone: 202-564-4267  
Last EDR Contact: 05/17/2010  
Next Scheduled EDR Contact: 08/30/2010  
Data Release Frequency: No Update Planned

## GOVERNMENT RECORDS SEARCHED / DATA CURRENCY TRACKING

### ***Federal Delisted NPL site list***

#### **DELISTED NPL: National Priority List Deletions**

The National Oil and Hazardous Substances Pollution Contingency Plan (NCP) establishes the criteria that the EPA uses to delete sites from the NPL. In accordance with 40 CFR 300.425.(e), sites may be deleted from the NPL where no further response is appropriate.

Date of Government Version: 03/31/2010	Source: EPA
Date Data Arrived at EDR: 04/02/2010	Telephone: N/A
Date Made Active in Reports: 04/12/2010	Last EDR Contact: 05/07/2010
Number of Days to Update: 10	Next Scheduled EDR Contact: 07/26/2010
	Data Release Frequency: Quarterly

### ***Federal CERCLIS list***

#### **CERCLIS: Comprehensive Environmental Response, Compensation, and Liability Information System**

CERCLIS contains data on potentially hazardous waste sites that have been reported to the USEPA by states, municipalities, private companies and private persons, pursuant to Section 103 of the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA). CERCLIS contains sites which are either proposed to or on the National Priorities List (NPL) and sites which are in the screening and assessment phase for possible inclusion on the NPL.

Date of Government Version: 01/29/2010	Source: EPA
Date Data Arrived at EDR: 02/09/2010	Telephone: 703-412-9810
Date Made Active in Reports: 04/12/2010	Last EDR Contact: 05/07/2010
Number of Days to Update: 62	Next Scheduled EDR Contact: 07/12/2010
	Data Release Frequency: Quarterly

#### **FEDERAL FACILITY: Federal Facility Site Information listing**

A listing of NPL and Base Realignment & Closure sites found in the CERCLIS database where FERRO is involved in cleanup projects.

Date of Government Version: 06/23/2009	Source: Environmental Protection Agency
Date Data Arrived at EDR: 01/15/2010	Telephone: 703-603-8704
Date Made Active in Reports: 02/10/2010	Last EDR Contact: 04/30/2010
Number of Days to Update: 26	Next Scheduled EDR Contact: 07/26/2010
	Data Release Frequency: Varies

### ***Federal CERCLIS NFRAP site List***

#### **CERCLIS-NFRAP: CERCLIS No Further Remedial Action Planned**

Archived sites are sites that have been removed and archived from the inventory of CERCLIS sites. Archived status indicates that, to the best of EPA's knowledge, assessment at a site has been completed and that EPA has determined no further steps will be taken to list this site on the National Priorities List (NPL), unless information indicates this decision was not appropriate or other considerations require a recommendation for listing at a later time. This decision does not necessarily mean that there is no hazard associated with a given site; it only means that, based upon available information, the location is not judged to be a potential NPL site.

Date of Government Version: 06/23/2009	Source: EPA
Date Data Arrived at EDR: 09/02/2009	Telephone: 703-412-9810
Date Made Active in Reports: 09/21/2009	Last EDR Contact: 05/07/2010
Number of Days to Update: 19	Next Scheduled EDR Contact: 06/14/2010
	Data Release Frequency: Quarterly

### ***Federal RCRA CORRACTS facilities list***

#### **CORRACTS: Corrective Action Report**

CORRACTS identifies hazardous waste handlers with RCRA corrective action activity.

Date of Government Version: 03/25/2010	Source: EPA
Date Data Arrived at EDR: 03/31/2010	Telephone: 800-424-9346
Date Made Active in Reports: 05/27/2010	Last EDR Contact: 05/17/2010
Number of Days to Update: 57	Next Scheduled EDR Contact: 08/30/2010
	Data Release Frequency: Quarterly



## GOVERNMENT RECORDS SEARCHED / DATA CURRENCY TRACKING

### *Federal RCRA non-CORRACTS TSD facilities list*

#### RCRA-TSDF: RCRA - Treatment, Storage and Disposal

RCRAInfo is EPA's comprehensive information system, providing access to data supporting the Resource Conservation and Recovery Act (RCRA) of 1976 and the Hazardous and Solid Waste Amendments (HSWA) of 1984. The database includes selective information on sites which generate, transport, store, treat and/or dispose of hazardous waste as defined by the Resource Conservation and Recovery Act (RCRA). Transporters are individuals or entities that move hazardous waste from the generator offsite to a facility that can recycle, treat, store, or dispose of the waste. TSDFs treat, store, or dispose of the waste.

Date of Government Version: 02/17/2010

Date Data Arrived at EDR: 02/19/2010

Date Made Active in Reports: 05/17/2010

Number of Days to Update: 87

Source: Environmental Protection Agency

Telephone: (415) 495-8895

Last EDR Contact: 04/29/2010

Next Scheduled EDR Contact: 07/19/2010

Data Release Frequency: Quarterly

### *Federal RCRA generators list*

#### RCRA-LQG: RCRA - Large Quantity Generators

RCRAInfo is EPA's comprehensive information system, providing access to data supporting the Resource Conservation and Recovery Act (RCRA) of 1976 and the Hazardous and Solid Waste Amendments (HSWA) of 1984. The database includes selective information on sites which generate, transport, store, treat and/or dispose of hazardous waste as defined by the Resource Conservation and Recovery Act (RCRA). Large quantity generators (LQGs) generate over 1,000 kilograms (kg) of hazardous waste, or over 1 kg of acutely hazardous waste per month.

Date of Government Version: 02/17/2010

Date Data Arrived at EDR: 02/19/2010

Date Made Active in Reports: 05/17/2010

Number of Days to Update: 87

Source: Environmental Protection Agency

Telephone: (415) 495-8895

Last EDR Contact: 04/29/2010

Next Scheduled EDR Contact: 07/19/2010

Data Release Frequency: Quarterly

#### RCRA-SQG: RCRA - Small Quantity Generators

RCRAInfo is EPA's comprehensive information system, providing access to data supporting the Resource Conservation and Recovery Act (RCRA) of 1976 and the Hazardous and Solid Waste Amendments (HSWA) of 1984. The database includes selective information on sites which generate, transport, store, treat and/or dispose of hazardous waste as defined by the Resource Conservation and Recovery Act (RCRA). Small quantity generators (SQGs) generate between 100 kg and 1,000 kg of hazardous waste per month.

Date of Government Version: 02/17/2010

Date Data Arrived at EDR: 02/19/2010

Date Made Active in Reports: 05/17/2010

Number of Days to Update: 87

Source: Environmental Protection Agency

Telephone: (415) 495-8895

Last EDR Contact: 04/29/2010

Next Scheduled EDR Contact: 07/19/2010

Data Release Frequency: Quarterly

#### RCRA-CESQG: RCRA - Conditionally Exempt Small Quantity Generators

RCRAInfo is EPA's comprehensive information system, providing access to data supporting the Resource Conservation and Recovery Act (RCRA) of 1976 and the Hazardous and Solid Waste Amendments (HSWA) of 1984. The database includes selective information on sites which generate, transport, store, treat and/or dispose of hazardous waste as defined by the Resource Conservation and Recovery Act (RCRA). Conditionally exempt small quantity generators (CESQGs) generate less than 100 kg of hazardous waste, or less than 1 kg of acutely hazardous waste per month.

Date of Government Version: 02/17/2010

Date Data Arrived at EDR: 02/19/2010

Date Made Active in Reports: 05/17/2010

Number of Days to Update: 87

Source: Environmental Protection Agency

Telephone: (415) 495-8895

Last EDR Contact: 04/29/2010

Next Scheduled EDR Contact: 07/19/2010

Data Release Frequency: Varies

### *Federal institutional controls / engineering controls registries*



## GOVERNMENT RECORDS SEARCHED / DATA CURRENCY TRACKING

### US ENG CONTROLS: Engineering Controls Sites List

A listing of sites with engineering controls in place. Engineering controls include various forms of caps, building foundations, liners, and treatment methods to create pathway elimination for regulated substances to enter environmental media or effect human health.

Date of Government Version: 12/20/2009  
Date Data Arrived at EDR: 01/20/2010  
Date Made Active in Reports: 04/12/2010  
Number of Days to Update: 82

Source: Environmental Protection Agency  
Telephone: 703-603-0695  
Last EDR Contact: 03/15/2010  
Next Scheduled EDR Contact: 06/28/2010  
Data Release Frequency: Varies

### US INST CONTROL: Sites with Institutional Controls

A listing of sites with institutional controls in place. Institutional controls include administrative measures, such as groundwater use restrictions, construction restrictions, property use restrictions, and post remediation care requirements intended to prevent exposure to contaminants remaining on site. Deed restrictions are generally required as part of the institutional controls.

Date of Government Version: 12/20/2009  
Date Data Arrived at EDR: 01/20/2010  
Date Made Active in Reports: 04/12/2010  
Number of Days to Update: 82

Source: Environmental Protection Agency  
Telephone: 703-603-0695  
Last EDR Contact: 03/15/2010  
Next Scheduled EDR Contact: 06/28/2010  
Data Release Frequency: Varies

### *Federal ERNS list*

#### ERNS: Emergency Response Notification System

Emergency Response Notification System. ERNS records and stores information on reported releases of oil and hazardous substances.

Date of Government Version: 12/31/2009  
Date Data Arrived at EDR: 01/22/2010  
Date Made Active in Reports: 02/11/2010  
Number of Days to Update: 20

Source: National Response Center, United States Coast Guard  
Telephone: 202-267-2180  
Last EDR Contact: 04/07/2010  
Next Scheduled EDR Contact: 07/19/2010  
Data Release Frequency: Annually

### *State- and tribal - equivalent NPL*

#### RESPONSE: State Response Sites

Identifies confirmed release sites where DTSC is involved in remediation, either in a lead or oversight capacity. These confirmed release sites are generally high-priority and high potential risk.

Date of Government Version: 05/11/2010  
Date Data Arrived at EDR: 05/12/2010  
Date Made Active in Reports: 05/18/2010  
Number of Days to Update: 6

Source: Department of Toxic Substances Control  
Telephone: 916-323-3400  
Last EDR Contact: 05/12/2010  
Next Scheduled EDR Contact: 08/23/2010  
Data Release Frequency: Quarterly

### *State- and tribal - equivalent CERCLIS*

#### ENVIROSTOR: EnviroStor Database

The Department of Toxic Substances Control's (DTSC's) Site Mitigation and Brownfields Reuse Program's (SMBRP's) EnviroStor database identifies sites that have known contamination or sites for which there may be reasons to investigate further. The database includes the following site types: Federal Superfund sites (National Priorities List (NPL)); State Response, including Military Facilities and State Superfund; Voluntary Cleanup; and School sites. EnviroStor provides similar information to the information that was available in CalSites, and provides additional site information, including, but not limited to, identification of formerly-contaminated properties that have been released for reuse, properties where environmental deed restrictions have been recorded to prevent inappropriate land uses, and risk characterization information that is used to assess potential impacts to public health and the environment at contaminated sites.

## GOVERNMENT RECORDS SEARCHED / DATA CURRENCY TRACKING

Date of Government Version: 05/11/2010  
Date Data Arrived at EDR: 05/12/2010  
Date Made Active in Reports: 05/18/2010  
Number of Days to Update: 6

Source: Department of Toxic Substances Control  
Telephone: 916-323-3400  
Last EDR Contact: 05/12/2010  
Next Scheduled EDR Contact: 08/23/2010  
Data Release Frequency: Quarterly

### **State and tribal landfill and/or solid waste disposal site lists**

#### **SWF/LF (SWIS): Solid Waste Information System**

Active, Closed and Inactive Landfills. SWF/LF records typically contain an inventory of solid waste disposal facilities or landfills. These may be active or inactive facilities or open dumps that failed to meet RCRA Section 4004 criteria for solid waste landfills or disposal sites.

Date of Government Version: 02/22/2010  
Date Data Arrived at EDR: 02/24/2010  
Date Made Active in Reports: 03/04/2010  
Number of Days to Update: 8

Source: Department of Resources Recycling and Recovery  
Telephone: 916-341-6320  
Last EDR Contact: 05/25/2010  
Next Scheduled EDR Contact: 09/06/2010  
Data Release Frequency: Quarterly

### **State and tribal leaking storage tank lists**

#### **LUST REG 9: Leaking Underground Storage Tank Report**

Orange, Riverside, San Diego counties. For more current information, please refer to the State Water Resources Control Board's LUST database.

Date of Government Version: 03/01/2001  
Date Data Arrived at EDR: 04/23/2001  
Date Made Active in Reports: 05/21/2001  
Number of Days to Update: 28

Source: California Regional Water Quality Control Board San Diego Region (9)  
Telephone: 858-637-5595  
Last EDR Contact: 03/29/2010  
Next Scheduled EDR Contact: 07/12/2010  
Data Release Frequency: No Update Planned

#### **LUST REG 7: Leaking Underground Storage Tank Case Listing**

Leaking Underground Storage Tank locations. Imperial, Riverside, San Diego, Santa Barbara counties.

Date of Government Version: 02/26/2004  
Date Data Arrived at EDR: 02/26/2004  
Date Made Active in Reports: 03/24/2004  
Number of Days to Update: 27

Source: California Regional Water Quality Control Board Colorado River Basin Region (7)  
Telephone: 760-776-8943  
Last EDR Contact: 05/03/2010  
Next Scheduled EDR Contact: 08/16/2010  
Data Release Frequency: No Update Planned

#### **LUST REG 6V: Leaking Underground Storage Tank Case Listing**

Leaking Underground Storage Tank locations. Inyo, Kern, Los Angeles, Mono, San Bernardino counties.

Date of Government Version: 06/07/2005  
Date Data Arrived at EDR: 06/07/2005  
Date Made Active in Reports: 06/29/2005  
Number of Days to Update: 22

Source: California Regional Water Quality Control Board Victorville Branch Office (6)  
Telephone: 760-241-7365  
Last EDR Contact: 03/15/2010  
Next Scheduled EDR Contact: 06/28/2010  
Data Release Frequency: No Update Planned

#### **LUST REG 6L: Leaking Underground Storage Tank Case Listing**

For more current information, please refer to the State Water Resources Control Board's LUST database.

Date of Government Version: 09/09/2003  
Date Data Arrived at EDR: 09/10/2003  
Date Made Active in Reports: 10/07/2003  
Number of Days to Update: 27

Source: California Regional Water Quality Control Board Lahontan Region (6)  
Telephone: 530-542-5572  
Last EDR Contact: 05/17/2010  
Next Scheduled EDR Contact: 08/30/2010  
Data Release Frequency: No Update Planned

#### **LUST REG 5: Leaking Underground Storage Tank Database**

Leaking Underground Storage Tank locations. Alameda, Alpine, Amador, Butte, Colusa, Contra Costa, Calaveras, El Dorado, Fresno, Glenn, Kern, Kings, Lake, Lassen, Madera, Mariposa, Merced, Modoc, Napa, Nevada, Placer, Plumas, Sacramento, San Joaquin, Shasta, Solano, Stanislaus, Sutter, Tehama, Tulare, Tuolumne, Yolo, Yuba counties.

## GOVERNMENT RECORDS SEARCHED / DATA CURRENCY TRACKING

Date of Government Version: 07/01/2008  
Date Data Arrived at EDR: 07/22/2008  
Date Made Active in Reports: 07/31/2008  
Number of Days to Update: 9

Source: California Regional Water Quality Control Board Central Valley Region (5)  
Telephone: 916-464-4834  
Last EDR Contact: 04/05/2010  
Next Scheduled EDR Contact: 07/19/2010  
Data Release Frequency: Quarterly

### LUST REG 4: Underground Storage Tank Leak List

Los Angeles, Ventura counties. For more current information, please refer to the State Water Resources Control Board's LUST database.

Date of Government Version: 09/07/2004  
Date Data Arrived at EDR: 09/07/2004  
Date Made Active in Reports: 10/12/2004  
Number of Days to Update: 35

Source: California Regional Water Quality Control Board Los Angeles Region (4)  
Telephone: 213-576-6710  
Last EDR Contact: 03/08/2010  
Next Scheduled EDR Contact: 06/21/2010  
Data Release Frequency: No Update Planned

### LUST REG 3: Leaking Underground Storage Tank Database

Leaking Underground Storage Tank locations. Monterey, San Benito, San Luis Obispo, Santa Barbara, Santa Cruz counties.

Date of Government Version: 05/19/2003  
Date Data Arrived at EDR: 05/19/2003  
Date Made Active in Reports: 06/02/2003  
Number of Days to Update: 14

Source: California Regional Water Quality Control Board Central Coast Region (3)  
Telephone: 805-542-4786  
Last EDR Contact: 04/19/2010  
Next Scheduled EDR Contact: 08/02/2010  
Data Release Frequency: No Update Planned

### LUST REG 2: Fuel Leak List

Leaking Underground Storage Tank locations. Alameda, Contra Costa, Marin, Napa, San Francisco, San Mateo, Santa Clara, Solano, Sonoma counties.

Date of Government Version: 09/30/2004  
Date Data Arrived at EDR: 10/20/2004  
Date Made Active in Reports: 11/19/2004  
Number of Days to Update: 30

Source: California Regional Water Quality Control Board San Francisco Bay Region (2)  
Telephone: 510-622-2433  
Last EDR Contact: 03/22/2010  
Next Scheduled EDR Contact: 07/05/2010  
Data Release Frequency: Quarterly

### LUST REG 1: Active Toxic Site Investigation

Del Norte, Humboldt, Lake, Mendocino, Modoc, Siskiyou, Sonoma, Trinity counties. For more current information, please refer to the State Water Resources Control Board's LUST database.

Date of Government Version: 02/01/2001  
Date Data Arrived at EDR: 02/28/2001  
Date Made Active in Reports: 03/29/2001  
Number of Days to Update: 29

Source: California Regional Water Quality Control Board North Coast (1)  
Telephone: 707-570-3769  
Last EDR Contact: 05/03/2010  
Next Scheduled EDR Contact: 08/16/2010  
Data Release Frequency: No Update Planned

### LUST: Geotracker's Leaking Underground Fuel Tank Report

Leaking Underground Storage Tank Incident Reports. LUST records contain an inventory of reported leaking underground storage tank incidents. Not all states maintain these records, and the information stored varies by state. For more information on a particular leaking underground storage tank sites, please contact the appropriate regulatory agency.

Date of Government Version: 05/05/2010  
Date Data Arrived at EDR: 05/05/2010  
Date Made Active in Reports: 05/18/2010  
Number of Days to Update: 13

Source: State Water Resources Control Board  
Telephone: see region list  
Last EDR Contact: 05/05/2010  
Next Scheduled EDR Contact: 07/05/2010  
Data Release Frequency: Quarterly

### LUST REG 8: Leaking Underground Storage Tanks

California Regional Water Quality Control Board Santa Ana Region (8). For more current information, please refer to the State Water Resources Control Board's LUST database.



## GOVERNMENT RECORDS SEARCHED / DATA CURRENCY TRACKING

Date of Government Version: 02/14/2005  
Date Data Arrived at EDR: 02/15/2005  
Date Made Active in Reports: 03/28/2005  
Number of Days to Update: 41

Source: California Regional Water Quality Control Board Santa Ana Region (8)  
Telephone: 909-782-4496  
Last EDR Contact: 04/19/2010  
Next Scheduled EDR Contact: 08/02/2010  
Data Release Frequency: Varies

### SLIC: Statewide SLIC Cases

The SLIC (Spills, Leaks, Investigations and Cleanup) program is designed to protect and restore water quality from spills, leaks, and similar discharges.

Date of Government Version: 05/05/2010  
Date Data Arrived at EDR: 05/05/2010  
Date Made Active in Reports: 05/18/2010  
Number of Days to Update: 13

Source: State Water Resources Control Board  
Telephone: 866-480-1028  
Last EDR Contact: 05/05/2010  
Next Scheduled EDR Contact: 07/05/2010  
Data Release Frequency: Varies

### SLIC REG 1: Active Toxic Site Investigations

The SLIC (Spills, Leaks, Investigations and Cleanup) program is designed to protect and restore water quality from spills, leaks, and similar discharges.

Date of Government Version: 04/03/2003  
Date Data Arrived at EDR: 04/07/2003  
Date Made Active in Reports: 04/25/2003  
Number of Days to Update: 18

Source: California Regional Water Quality Control Board, North Coast Region (1)  
Telephone: 707-576-2220  
Last EDR Contact: 05/03/2010  
Next Scheduled EDR Contact: 08/16/2010  
Data Release Frequency: No Update Planned

### SLIC REG 2: Spills, Leaks, Investigation & Cleanup Cost Recovery Listing

The SLIC (Spills, Leaks, Investigations and Cleanup) program is designed to protect and restore water quality from spills, leaks, and similar discharges.

Date of Government Version: 09/30/2004  
Date Data Arrived at EDR: 10/20/2004  
Date Made Active in Reports: 11/19/2004  
Number of Days to Update: 30

Source: Regional Water Quality Control Board San Francisco Bay Region (2)  
Telephone: 510-286-0457  
Last EDR Contact: 03/22/2010  
Next Scheduled EDR Contact: 07/05/2010  
Data Release Frequency: Quarterly

### SLIC REG 3: Spills, Leaks, Investigation & Cleanup Cost Recovery Listing

The SLIC (Spills, Leaks, Investigations and Cleanup) program is designed to protect and restore water quality from spills, leaks, and similar discharges.

Date of Government Version: 05/18/2006  
Date Data Arrived at EDR: 05/18/2006  
Date Made Active in Reports: 06/15/2006  
Number of Days to Update: 28

Source: California Regional Water Quality Control Board Central Coast Region (3)  
Telephone: 805-549-3147  
Last EDR Contact: 04/19/2010  
Next Scheduled EDR Contact: 08/02/2010  
Data Release Frequency: Semi-Annually

### SLIC REG 4: Spills, Leaks, Investigation & Cleanup Cost Recovery Listing

The SLIC (Spills, Leaks, Investigations and Cleanup) program is designed to protect and restore water quality from spills, leaks, and similar discharges.

Date of Government Version: 11/17/2004  
Date Data Arrived at EDR: 11/18/2004  
Date Made Active in Reports: 01/04/2005  
Number of Days to Update: 47

Source: Region Water Quality Control Board Los Angeles Region (4)  
Telephone: 213-576-6600  
Last EDR Contact: 04/05/2010  
Next Scheduled EDR Contact: 07/19/2010  
Data Release Frequency: Varies

### SLIC REG 5: Spills, Leaks, Investigation & Cleanup Cost Recovery Listing

The SLIC (Spills, Leaks, Investigations and Cleanup) program is designed to protect and restore water quality from spills, leaks, and similar discharges.

## GOVERNMENT RECORDS SEARCHED / DATA CURRENCY TRACKING

Date of Government Version: 04/01/2005  
Date Data Arrived at EDR: 04/05/2005  
Date Made Active in Reports: 04/21/2005  
Number of Days to Update: 16

Source: Regional Water Quality Control Board Central Valley Region (5)  
Telephone: 916-464-3291  
Last EDR Contact: 03/15/2010  
Next Scheduled EDR Contact: 06/28/2010  
Data Release Frequency: Semi-Annually

### SLIC REG 6V: Spills, Leaks, Investigation & Cleanup Cost Recovery Listing

The SLIC (Spills, Leaks, Investigations and Cleanup) program is designed to protect and restore water quality from spills, leaks, and similar discharges.

Date of Government Version: 05/24/2005  
Date Data Arrived at EDR: 05/25/2005  
Date Made Active in Reports: 06/16/2005  
Number of Days to Update: 22

Source: Regional Water Quality Control Board, Victorville Branch  
Telephone: 619-241-6583  
Last EDR Contact: 05/17/2010  
Next Scheduled EDR Contact: 08/30/2010  
Data Release Frequency: Semi-Annually

### SLIC REG 6L: SLIC Sites

The SLIC (Spills, Leaks, Investigations and Cleanup) program is designed to protect and restore water quality from spills, leaks, and similar discharges.

Date of Government Version: 09/07/2004  
Date Data Arrived at EDR: 09/07/2004  
Date Made Active in Reports: 10/12/2004  
Number of Days to Update: 35

Source: California Regional Water Quality Control Board, Lahontan Region  
Telephone: 530-542-5574  
Last EDR Contact: 05/17/2010  
Next Scheduled EDR Contact: 08/30/2010  
Data Release Frequency: No Update Planned

### SLIC REG 7: SLIC List

The SLIC (Spills, Leaks, Investigations and Cleanup) program is designed to protect and restore water quality from spills, leaks, and similar discharges.

Date of Government Version: 11/24/2004  
Date Data Arrived at EDR: 11/29/2004  
Date Made Active in Reports: 01/04/2005  
Number of Days to Update: 36

Source: California Regional Quality Control Board, Colorado River Basin Region  
Telephone: 760-346-7491  
Last EDR Contact: 05/03/2010  
Next Scheduled EDR Contact: 08/16/2010  
Data Release Frequency: No Update Planned

### SLIC REG 8: Spills, Leaks, Investigation & Cleanup Cost Recovery Listing

The SLIC (Spills, Leaks, Investigations and Cleanup) program is designed to protect and restore water quality from spills, leaks, and similar discharges.

Date of Government Version: 04/03/2008  
Date Data Arrived at EDR: 04/03/2008  
Date Made Active in Reports: 04/14/2008  
Number of Days to Update: 11

Source: California Region Water Quality Control Board Santa Ana Region (8)  
Telephone: 951-782-3298  
Last EDR Contact: 03/15/2010  
Next Scheduled EDR Contact: 06/28/2010  
Data Release Frequency: Semi-Annually

### SLIC REG 9: Spills, Leaks, Investigation & Cleanup Cost Recovery Listing

The SLIC (Spills, Leaks, Investigations and Cleanup) program is designed to protect and restore water quality from spills, leaks, and similar discharges.

Date of Government Version: 09/10/2007  
Date Data Arrived at EDR: 09/11/2007  
Date Made Active in Reports: 09/28/2007  
Number of Days to Update: 17

Source: California Regional Water Quality Control Board San Diego Region (9)  
Telephone: 858-467-2980  
Last EDR Contact: 05/10/2010  
Next Scheduled EDR Contact: 08/23/2010  
Data Release Frequency: Annually

### INDIAN LUST R10: Leaking Underground Storage Tanks on Indian Land

LUSTs on Indian land in Alaska, Idaho, Oregon and Washington.

## GOVERNMENT RECORDS SEARCHED / DATA CURRENCY TRACKING

Date of Government Version: 05/04/2010  
Date Data Arrived at EDR: 05/05/2010  
Date Made Active in Reports: 05/27/2010  
Number of Days to Update: 22

Source: EPA Region 10  
Telephone: 206-553-2857  
Last EDR Contact: 05/03/2010  
Next Scheduled EDR Contact: 08/16/2010  
Data Release Frequency: Quarterly

### INDIAN LUST R1: Leaking Underground Storage Tanks on Indian Land

A listing of leaking underground storage tank locations on Indian Land.

Date of Government Version: 02/19/2009  
Date Data Arrived at EDR: 02/19/2009  
Date Made Active in Reports: 03/16/2009  
Number of Days to Update: 25

Source: EPA Region 1  
Telephone: 617-918-1313  
Last EDR Contact: 05/03/2010  
Next Scheduled EDR Contact: 08/16/2010  
Data Release Frequency: Varies

### INDIAN LUST R8: Leaking Underground Storage Tanks on Indian Land

LUSTs on Indian land in Colorado, Montana, North Dakota, South Dakota, Utah and Wyoming.

Date of Government Version: 02/25/2010  
Date Data Arrived at EDR: 02/25/2010  
Date Made Active in Reports: 04/12/2010  
Number of Days to Update: 46

Source: EPA Region 8  
Telephone: 303-312-6271  
Last EDR Contact: 05/03/2010  
Next Scheduled EDR Contact: 08/16/2010  
Data Release Frequency: Quarterly

### INDIAN LUST R6: Leaking Underground Storage Tanks on Indian Land

LUSTs on Indian land in New Mexico and Oklahoma.

Date of Government Version: 05/03/2010  
Date Data Arrived at EDR: 05/05/2010  
Date Made Active in Reports: 05/27/2010  
Number of Days to Update: 22

Source: EPA Region 6  
Telephone: 214-665-6597  
Last EDR Contact: 05/03/2010  
Next Scheduled EDR Contact: 08/16/2010  
Data Release Frequency: Varies

### INDIAN LUST R4: Leaking Underground Storage Tanks on Indian Land

LUSTs on Indian land in Florida, Mississippi and North Carolina.

Date of Government Version: 03/10/2010  
Date Data Arrived at EDR: 03/16/2010  
Date Made Active in Reports: 04/12/2010  
Number of Days to Update: 27

Source: EPA Region 4  
Telephone: 404-562-8677  
Last EDR Contact: 05/03/2010  
Next Scheduled EDR Contact: 08/16/2010  
Data Release Frequency: Semi-Annually

### INDIAN LUST R9: Leaking Underground Storage Tanks on Indian Land

LUSTs on Indian land in Arizona, California, New Mexico and Nevada

Date of Government Version: 02/01/2010  
Date Data Arrived at EDR: 03/03/2010  
Date Made Active in Reports: 04/12/2010  
Number of Days to Update: 40

Source: Environmental Protection Agency  
Telephone: 415-972-3372  
Last EDR Contact: 05/03/2010  
Next Scheduled EDR Contact: 08/16/2010  
Data Release Frequency: Quarterly

### INDIAN LUST R7: Leaking Underground Storage Tanks on Indian Land

LUSTs on Indian land in Iowa, Kansas, and Nebraska

Date of Government Version: 03/24/2009  
Date Data Arrived at EDR: 05/20/2009  
Date Made Active in Reports: 06/17/2009  
Number of Days to Update: 28

Source: EPA Region 7  
Telephone: 913-551-7003  
Last EDR Contact: 05/04/2010  
Next Scheduled EDR Contact: 08/16/2010  
Data Release Frequency: Varies

**State and tribal registered storage tank lists**



## GOVERNMENT RECORDS SEARCHED / DATA CURRENCY TRACKING

### UST: Active UST Facilities

Active UST facilities gathered from the local regulatory agencies

Date of Government Version: 05/05/2010	Source: SWRCB
Date Data Arrived at EDR: 05/05/2010	Telephone: 916-480-1028
Date Made Active in Reports: 05/18/2010	Last EDR Contact: 05/05/2010
Number of Days to Update: 13	Next Scheduled EDR Contact: 07/05/2010
	Data Release Frequency: Semi-Annually

### AST: Aboveground Petroleum Storage Tank Facilities

Registered Aboveground Storage Tanks.

Date of Government Version: 08/01/2009	Source: State Water Resources Control Board
Date Data Arrived at EDR: 09/10/2009	Telephone: 916-341-5712
Date Made Active in Reports: 10/01/2009	Last EDR Contact: 04/12/2010
Number of Days to Update: 21	Next Scheduled EDR Contact: 07/26/2010
	Data Release Frequency: Quarterly

### INDIAN UST R10: Underground Storage Tanks on Indian Land

The Indian Underground Storage Tank (UST) database provides information about underground storage tanks on Indian land in EPA Region 10 (Alaska, Idaho, Oregon, Washington, and Tribal Nations).

Date of Government Version: 05/04/2010	Source: EPA Region 10
Date Data Arrived at EDR: 05/05/2010	Telephone: 206-553-2857
Date Made Active in Reports: 05/27/2010	Last EDR Contact: 05/03/2010
Number of Days to Update: 22	Next Scheduled EDR Contact: 08/16/2010
	Data Release Frequency: Quarterly

### INDIAN UST R9: Underground Storage Tanks on Indian Land

The Indian Underground Storage Tank (UST) database provides information about underground storage tanks on Indian land in EPA Region 9 (Arizona, California, Hawaii, Nevada, the Pacific Islands, and Tribal Nations).

Date of Government Version: 02/01/2010	Source: EPA Region 9
Date Data Arrived at EDR: 03/03/2010	Telephone: 415-972-3368
Date Made Active in Reports: 04/12/2010	Last EDR Contact: 05/03/2010
Number of Days to Update: 40	Next Scheduled EDR Contact: 08/16/2010
	Data Release Frequency: Quarterly

### INDIAN UST R8: Underground Storage Tanks on Indian Land

The Indian Underground Storage Tank (UST) database provides information about underground storage tanks on Indian land in EPA Region 8 (Colorado, Montana, North Dakota, South Dakota, Utah, Wyoming and 27 Tribal Nations).

Date of Government Version: 02/25/2010	Source: EPA Region 8
Date Data Arrived at EDR: 02/25/2010	Telephone: 303-312-6137
Date Made Active in Reports: 04/12/2010	Last EDR Contact: 05/03/2010
Number of Days to Update: 46	Next Scheduled EDR Contact: 08/16/2010
	Data Release Frequency: Quarterly

### INDIAN UST R7: Underground Storage Tanks on Indian Land

The Indian Underground Storage Tank (UST) database provides information about underground storage tanks on Indian land in EPA Region 7 (Iowa, Kansas, Missouri, Nebraska, and 9 Tribal Nations).

Date of Government Version: 04/01/2008	Source: EPA Region 7
Date Data Arrived at EDR: 12/30/2008	Telephone: 913-551-7003
Date Made Active in Reports: 03/16/2009	Last EDR Contact: 05/12/2010
Number of Days to Update: 76	Next Scheduled EDR Contact: 08/16/2010
	Data Release Frequency: Varies

### INDIAN UST R6: Underground Storage Tanks on Indian Land

The Indian Underground Storage Tank (UST) database provides information about underground storage tanks on Indian land in EPA Region 6 (Louisiana, Arkansas, Oklahoma, New Mexico, Texas and 65 Tribes).

## GOVERNMENT RECORDS SEARCHED / DATA CURRENCY TRACKING

Date of Government Version: 05/03/2010  
Date Data Arrived at EDR: 05/05/2010  
Date Made Active in Reports: 05/27/2010  
Number of Days to Update: 22

Source: EPA Region 6  
Telephone: 214-665-7591  
Last EDR Contact: 05/03/2010  
Next Scheduled EDR Contact: 08/16/2010  
Data Release Frequency: Semi-Annually

### INDIAN UST R5: Underground Storage Tanks on Indian Land

The Indian Underground Storage Tank (UST) database provides information about underground storage tanks on Indian land in EPA Region 5 (Michigan, Minnesota and Wisconsin and Tribal Nations).

Date of Government Version: 02/11/2010  
Date Data Arrived at EDR: 02/11/2010  
Date Made Active in Reports: 04/12/2010  
Number of Days to Update: 60

Source: EPA Region 5  
Telephone: 312-886-6136  
Last EDR Contact: 05/03/2010  
Next Scheduled EDR Contact: 08/16/2010  
Data Release Frequency: Varies

### INDIAN UST R4: Underground Storage Tanks on Indian Land

The Indian Underground Storage Tank (UST) database provides information about underground storage tanks on Indian land in EPA Region 4 (Alabama, Florida, Georgia, Kentucky, Mississippi, North Carolina, South Carolina, Tennessee and Tribal Nations)

Date of Government Version: 03/10/2010  
Date Data Arrived at EDR: 03/16/2010  
Date Made Active in Reports: 04/12/2010  
Number of Days to Update: 27

Source: EPA Region 4  
Telephone: 404-562-9424  
Last EDR Contact: 05/03/2010  
Next Scheduled EDR Contact: 08/16/2010  
Data Release Frequency: Semi-Annually

### INDIAN UST R1: Underground Storage Tanks on Indian Land

The Indian Underground Storage Tank (UST) database provides information about underground storage tanks on Indian land in EPA Region 1 (Connecticut, Maine, Massachusetts, New Hampshire, Rhode Island, Vermont and ten Tribal Nations).

Date of Government Version: 02/19/2009  
Date Data Arrived at EDR: 02/19/2009  
Date Made Active in Reports: 03/16/2009  
Number of Days to Update: 25

Source: EPA, Region 1  
Telephone: 617-918-1313  
Last EDR Contact: 05/03/2010  
Next Scheduled EDR Contact: 08/16/2010  
Data Release Frequency: Varies

### FEMA UST: Underground Storage Tank Listing

A listing of all FEMA owned underground storage tanks.

Date of Government Version: 01/01/2010  
Date Data Arrived at EDR: 02/16/2010  
Date Made Active in Reports: 04/12/2010  
Number of Days to Update: 55

Source: FEMA  
Telephone: 202-646-5797  
Last EDR Contact: 04/19/2010  
Next Scheduled EDR Contact: 08/02/2010  
Data Release Frequency: Varies

### *State and tribal voluntary cleanup sites*

#### INDIAN VCP R7: Voluntary Cleanup Priority Listing

A listing of voluntary cleanup priority sites located on Indian Land located in Region 7.

Date of Government Version: 03/20/2008  
Date Data Arrived at EDR: 04/22/2008  
Date Made Active in Reports: 05/19/2008  
Number of Days to Update: 27

Source: EPA, Region 7  
Telephone: 913-551-7365  
Last EDR Contact: 04/20/2009  
Next Scheduled EDR Contact: 07/20/2009  
Data Release Frequency: Varies

#### VCP: Voluntary Cleanup Program Properties

Contains low threat level properties with either confirmed or unconfirmed releases and the project proponents have request that DTSC oversee investigation and/or cleanup activities and have agreed to provide coverage for DTSC's costs.

## GOVERNMENT RECORDS SEARCHED / DATA CURRENCY TRACKING

Date of Government Version: 05/11/2010  
Date Data Arrived at EDR: 05/12/2010  
Date Made Active in Reports: 05/18/2010  
Number of Days to Update: 6

Source: Department of Toxic Substances Control  
Telephone: 916-323-3400  
Last EDR Contact: 05/12/2010  
Next Scheduled EDR Contact: 08/23/2010  
Data Release Frequency: Quarterly

### INDIAN VCP R1: Voluntary Cleanup Priority Listing

A listing of voluntary cleanup priority sites located on Indian Land located in Region 1.

Date of Government Version: 04/02/2008  
Date Data Arrived at EDR: 04/22/2008  
Date Made Active in Reports: 05/19/2008  
Number of Days to Update: 27

Source: EPA, Region 1  
Telephone: 617-918-1102  
Last EDR Contact: 04/05/2010  
Next Scheduled EDR Contact: 07/19/2010  
Data Release Frequency: Varies

### ADDITIONAL ENVIRONMENTAL RECORDS

#### *Local Brownfield lists*

#### US BROWNFIELDS: A Listing of Brownfields Sites

Included in the listing are brownfields properties addresses by Cooperative Agreement Recipients and brownfields properties addressed by Targeted Brownfields Assessments. Targeted Brownfields Assessments-EPA's Targeted Brownfields Assessments (TBA) program is designed to help states, tribes, and municipalities--especially those without EPA Brownfields Assessment Demonstration Pilots--minimize the uncertainties of contamination often associated with brownfields. Under the TBA program, EPA provides funding and/or technical assistance for environmental assessments at brownfields sites throughout the country. Targeted Brownfields Assessments supplement and work with other efforts under EPA's Brownfields Initiative to promote cleanup and redevelopment of brownfields. Cooperative Agreement Recipients-States, political subdivisions, territories, and Indian tribes become Brownfields Cleanup Revolving Loan Fund (BCRLF) cooperative agreement recipients when they enter into BCRLF cooperative agreements with the U.S. EPA. EPA selects BCRLF cooperative agreement recipients based on a proposal and application process. BCRLF cooperative agreement recipients must use EPA funds provided through BCRLF cooperative agreement for specified brownfields-related cleanup activities.

Date of Government Version: 03/02/2010  
Date Data Arrived at EDR: 03/23/2010  
Date Made Active in Reports: 05/17/2010  
Number of Days to Update: 55

Source: Environmental Protection Agency  
Telephone: 202-566-2777  
Last EDR Contact: 03/23/2010  
Next Scheduled EDR Contact: 07/12/2010  
Data Release Frequency: Semi-Annually

#### *Local Lists of Landfill / Solid Waste Disposal Sites*

#### ODI: Open Dump Inventory

An open dump is defined as a disposal facility that does not comply with one or more of the Part 257 or Part 258 Subtitle D Criteria.

Date of Government Version: 06/30/1985  
Date Data Arrived at EDR: 08/09/2004  
Date Made Active in Reports: 09/17/2004  
Number of Days to Update: 39

Source: Environmental Protection Agency  
Telephone: 800-424-9346  
Last EDR Contact: 06/09/2004  
Next Scheduled EDR Contact: N/A  
Data Release Frequency: No Update Planned

#### DEBRIS REGION 9: Torres Martinez Reservation Illegal Dump Site Locations

A listing of illegal dump sites location on the Torres Martinez Indian Reservation located in eastern Riverside County and northern Imperial County, California.

Date of Government Version: 01/12/2009  
Date Data Arrived at EDR: 05/07/2009  
Date Made Active in Reports: 09/21/2009  
Number of Days to Update: 137

Source: EPA, Region 9  
Telephone: 415-972-3336  
Last EDR Contact: 03/22/2010  
Next Scheduled EDR Contact: 06/21/2010  
Data Release Frequency: Varies



## GOVERNMENT RECORDS SEARCHED / DATA CURRENCY TRACKING

### WMUDS/SWAT: Waste Management Unit Database

Waste Management Unit Database System. WMUDS is used by the State Water Resources Control Board staff and the Regional Water Quality Control Boards for program tracking and inventory of waste management units. WMUDS is composed of the following databases: Facility Information, Scheduled Inspections Information, Waste Management Unit Information, SWAT Program Information, SWAT Report Summary Information, SWAT Report Summary Data, Chapter 15 (formerly Subchapter 15) Information, Chapter 15 Monitoring Parameters, TPCA Program Information, RCRA Program Information, Closure Information, and Interested Parties Information.

Date of Government Version: 04/01/2000  
Date Data Arrived at EDR: 04/10/2000  
Date Made Active in Reports: 05/10/2000  
Number of Days to Update: 30

Source: State Water Resources Control Board  
Telephone: 916-227-4448  
Last EDR Contact: 05/17/2010  
Next Scheduled EDR Contact: 08/30/2010  
Data Release Frequency: Quarterly

### SWRCY: Recycler Database

A listing of recycling facilities in California.

Date of Government Version: 01/06/2010  
Date Data Arrived at EDR: 03/24/2010  
Date Made Active in Reports: 04/09/2010  
Number of Days to Update: 16

Source: Department of Conservation  
Telephone: 916-323-3836  
Last EDR Contact: 03/24/2010  
Next Scheduled EDR Contact: 07/05/2010  
Data Release Frequency: Quarterly

### HAULERS: Registered Waste Tire Haulers Listing

A listing of registered waste tire haulers.

Date of Government Version: 03/09/2010  
Date Data Arrived at EDR: 03/10/2010  
Date Made Active in Reports: 04/09/2010  
Number of Days to Update: 30

Source: Integrated Waste Management Board  
Telephone: 916-341-6422  
Last EDR Contact: 05/24/2010  
Next Scheduled EDR Contact: 09/06/2010  
Data Release Frequency: Varies

### INDIAN ODI: Report on the Status of Open Dumps on Indian Lands

Location of open dumps on Indian land.

Date of Government Version: 12/31/1998  
Date Data Arrived at EDR: 12/03/2007  
Date Made Active in Reports: 01/24/2008  
Number of Days to Update: 52

Source: Environmental Protection Agency  
Telephone: 703-308-8245  
Last EDR Contact: 05/24/2010  
Next Scheduled EDR Contact: 08/23/2010  
Data Release Frequency: Varies

### *Local Lists of Hazardous waste / Contaminated Sites*

#### US CDL: Clandestine Drug Labs

A listing of clandestine drug lab locations. The U.S. Department of Justice ("the Department") provides this web site as a public service. It contains addresses of some locations where law enforcement agencies reported they found chemicals or other items that indicated the presence of either clandestine drug laboratories or dumpsites. In most cases, the source of the entries is not the Department, and the Department has not verified the entry and does not guarantee its accuracy. Members of the public must verify the accuracy of all entries by, for example, contacting local law enforcement and local health departments.

Date of Government Version: 08/19/2009  
Date Data Arrived at EDR: 12/29/2009  
Date Made Active in Reports: 02/10/2010  
Number of Days to Update: 43

Source: Drug Enforcement Administration  
Telephone: 202-307-1000  
Last EDR Contact: 12/14/2009  
Next Scheduled EDR Contact: 03/22/2010  
Data Release Frequency: Quarterly

#### HIST CAL-SITES: Calsites Database

The Calsites database contains potential or confirmed hazardous substance release properties. In 1996, California EPA reevaluated and significantly reduced the number of sites in the Calsites database. No longer updated by the state agency. It has been replaced by ENVIROSTOR.

## GOVERNMENT RECORDS SEARCHED / DATA CURRENCY TRACKING

Date of Government Version: 08/08/2005  
Date Data Arrived at EDR: 08/03/2006  
Date Made Active in Reports: 08/24/2006  
Number of Days to Update: 21

Source: Department of Toxic Substance Control  
Telephone: 916-323-3400  
Last EDR Contact: 02/23/2009  
Next Scheduled EDR Contact: 05/25/2009  
Data Release Frequency: No Update Planned

### SCH: School Property Evaluation Program

This category contains proposed and existing school sites that are being evaluated by DTSC for possible hazardous materials contamination. In some cases, these properties may be listed in the CalSites category depending on the level of threat to public health and safety or the environment they pose.

Date of Government Version: 05/11/2010  
Date Data Arrived at EDR: 05/12/2010  
Date Made Active in Reports: 05/18/2010  
Number of Days to Update: 6

Source: Department of Toxic Substances Control  
Telephone: 916-323-3400  
Last EDR Contact: 05/12/2010  
Next Scheduled EDR Contact: 08/23/2010  
Data Release Frequency: Quarterly

### TOXIC PITS: Toxic Pits Cleanup Act Sites

Toxic PITS Cleanup Act Sites. TOXIC PITS identifies sites suspected of containing hazardous substances where cleanup has not yet been completed.

Date of Government Version: 07/01/1995  
Date Data Arrived at EDR: 08/30/1995  
Date Made Active in Reports: 09/26/1995  
Number of Days to Update: 27

Source: State Water Resources Control Board  
Telephone: 916-227-4364  
Last EDR Contact: 01/26/2009  
Next Scheduled EDR Contact: 04/27/2009  
Data Release Frequency: No Update Planned

### CDL: Clandestine Drug Labs

A listing of drug lab locations. Listing of a location in this database does not indicate that any illegal drug lab materials were or were not present there, and does not constitute a determination that the location either requires or does not require additional cleanup work.

Date of Government Version: 12/31/2009  
Date Data Arrived at EDR: 02/25/2010  
Date Made Active in Reports: 03/04/2010  
Number of Days to Update: 7

Source: Department of Toxic Substances Control  
Telephone: 916-255-6504  
Last EDR Contact: 04/05/2010  
Next Scheduled EDR Contact: 07/19/2010  
Data Release Frequency: Varies

### US HIST CDL: National Clandestine Laboratory Register

A listing of clandestine drug lab locations. The U.S. Department of Justice ("the Department") provides this web site as a public service. It contains addresses of some locations where law enforcement agencies reported they found chemicals or other items that indicated the presence of either clandestine drug laboratories or dumpsites. In most cases, the source of the entries is not the Department, and the Department has not verified the entry and does not guarantee its accuracy. Members of the public must verify the accuracy of all entries by, for example, contacting local law enforcement and local health departments.

Date of Government Version: 09/01/2007  
Date Data Arrived at EDR: 11/19/2008  
Date Made Active in Reports: 03/30/2009  
Number of Days to Update: 131

Source: Drug Enforcement Administration  
Telephone: 202-307-1000  
Last EDR Contact: 03/23/2009  
Next Scheduled EDR Contact: 06/22/2009  
Data Release Frequency: No Update Planned

### Local Lists of Registered Storage Tanks

#### CA FID UST: Facility Inventory Database

The Facility Inventory Database (FID) contains a historical listing of active and inactive underground storage tank locations from the State Water Resource Control Board. Refer to local/county source for current data.

Date of Government Version: 10/31/1994  
Date Data Arrived at EDR: 09/05/1995  
Date Made Active in Reports: 09/29/1995  
Number of Days to Update: 24

Source: California Environmental Protection Agency  
Telephone: 916-341-5851  
Last EDR Contact: 12/28/1998  
Next Scheduled EDR Contact: N/A  
Data Release Frequency: No Update Planned

## GOVERNMENT RECORDS SEARCHED / DATA CURRENCY TRACKING

### UST MENDOCINO: Mendocino County UST Database

A listing of underground storage tank locations in Mendocino County.

Date of Government Version: 09/23/2009	Source: Department of Public Health
Date Data Arrived at EDR: 09/23/2009	Telephone: 707-463-4466
Date Made Active in Reports: 10/01/2009	Last EDR Contact: 03/08/2010
Number of Days to Update: 8	Next Scheduled EDR Contact: 06/21/2010
	Data Release Frequency: Annually

### HIST UST: Hazardous Substance Storage Container Database

The Hazardous Substance Storage Container Database is a historical listing of UST sites. Refer to local/county source for current data.

Date of Government Version: 10/15/1990	Source: State Water Resources Control Board
Date Data Arrived at EDR: 01/25/1991	Telephone: 916-341-5851
Date Made Active in Reports: 02/12/1991	Last EDR Contact: 07/26/2001
Number of Days to Update: 18	Next Scheduled EDR Contact: N/A
	Data Release Frequency: No Update Planned

### SWEEPS UST: SWEEPS UST Listing

Statewide Environmental Evaluation and Planning System. This underground storage tank listing was updated and maintained by a company contacted by the SWRCB in the early 1990's. The listing is no longer updated or maintained. The local agency is the contact for more information on a site on the SWEEPS list.

Date of Government Version: 06/01/1994	Source: State Water Resources Control Board
Date Data Arrived at EDR: 07/07/2005	Telephone: N/A
Date Made Active in Reports: 08/11/2005	Last EDR Contact: 06/03/2005
Number of Days to Update: 35	Next Scheduled EDR Contact: N/A
	Data Release Frequency: No Update Planned

### Local Land Records

#### LIENS 2: CERCLA Lien Information

A Federal CERCLA ('Superfund') lien can exist by operation of law at any site or property at which EPA has spent Superfund monies. These monies are spent to investigate and address releases and threatened releases of contamination. CERCLIS provides information as to the identity of these sites and properties.

Date of Government Version: 02/05/2010	Source: Environmental Protection Agency
Date Data Arrived at EDR: 02/11/2010	Telephone: 202-564-6023
Date Made Active in Reports: 04/12/2010	Last EDR Contact: 05/03/2010
Number of Days to Update: 60	Next Scheduled EDR Contact: 08/16/2010
	Data Release Frequency: Varies

#### LUCIS: Land Use Control Information System

LUCIS contains records of land use control information pertaining to the former Navy Base Realignment and Closure properties.

Date of Government Version: 12/09/2005	Source: Department of the Navy
Date Data Arrived at EDR: 12/11/2006	Telephone: 843-820-7326
Date Made Active in Reports: 01/11/2007	Last EDR Contact: 05/24/2010
Number of Days to Update: 31	Next Scheduled EDR Contact: 09/06/2010
	Data Release Frequency: Varies

#### LIENS: Environmental Liens Listing

A listing of property locations with environmental liens for California where DTSC is a lien holder.

Date of Government Version: 05/05/2010	Source: Department of Toxic Substances Control
Date Data Arrived at EDR: 05/07/2010	Telephone: 916-323-3400
Date Made Active in Reports: 05/18/2010	Last EDR Contact: 05/03/2010
Number of Days to Update: 11	Next Scheduled EDR Contact: 08/02/2010
	Data Release Frequency: Varies



## GOVERNMENT RECORDS SEARCHED / DATA CURRENCY TRACKING

### DEED: Deed Restriction Listing

Site Mitigation and Brownfields Reuse Program Facility Sites with Deed Restrictions & Hazardous Waste Management Program Facility Sites with Deed / Land Use Restriction. The DTSC Site Mitigation and Brownfields Reuse Program (SMBRP) list includes sites cleaned up under the program's oversight and generally does not include current or former hazardous waste facilities that required a hazardous waste facility permit. The list represents deed restrictions that are active. Some sites have multiple deed restrictions. The DTSC Hazardous Waste Management Program (HWMP) has developed a list of current or former hazardous waste facilities that have a recorded land use restriction at the local county recorder's office. The land use restrictions on this list were required by the DTSC HWMP as a result of the presence of hazardous substances that remain on site after the facility (or part of the facility) has been closed or cleaned up. The types of land use restriction include deed notice, deed restriction, or a land use restriction that binds current and future owners.

Date of Government Version: 03/15/2010  
Date Data Arrived at EDR: 03/16/2010  
Date Made Active in Reports: 04/09/2010  
Number of Days to Update: 24

Source: Department of Toxic Substances Control  
Telephone: 916-323-3400  
Last EDR Contact: 03/16/2010  
Next Scheduled EDR Contact: 12/28/2009  
Data Release Frequency: Semi-Annually

### Records of Emergency Release Reports

#### HMIRS: Hazardous Materials Information Reporting System

Hazardous Materials Incident Report System. HMIRS contains hazardous material spill incidents reported to DOT.

Date of Government Version: 04/06/2010  
Date Data Arrived at EDR: 04/07/2010  
Date Made Active in Reports: 05/27/2010  
Number of Days to Update: 50

Source: U.S. Department of Transportation  
Telephone: 202-366-4555  
Last EDR Contact: 04/07/2010  
Next Scheduled EDR Contact: 07/19/2010  
Data Release Frequency: Annually

#### CHMIRS: California Hazardous Material Incident Report System

California Hazardous Material Incident Reporting System. CHMIRS contains information on reported hazardous material incidents (accidental releases or spills).

Date of Government Version: 12/31/2007  
Date Data Arrived at EDR: 05/09/2008  
Date Made Active in Reports: 06/20/2008  
Number of Days to Update: 42

Source: Office of Emergency Services  
Telephone: 916-845-8400  
Last EDR Contact: 05/03/2010  
Next Scheduled EDR Contact: 08/16/2010  
Data Release Frequency: Varies

#### LDS: Land Disposal Sites Listing

The Land Disposal program regulates of waste discharge to land for treatment, storage and disposal in waste management units.

Date of Government Version: 05/05/2010  
Date Data Arrived at EDR: 05/05/2010  
Date Made Active in Reports: 05/18/2010  
Number of Days to Update: 13

Source: State Water Quality Control Board  
Telephone: 866-480-1028  
Last EDR Contact: 05/05/2010  
Next Scheduled EDR Contact: 07/05/2010  
Data Release Frequency: Quarterly

#### MCS: Military Cleanup Sites Listing

The State Water Resources Control Board and nine Regional Water Quality Control Boards partner with the Department of Defense (DoD) through the Defense and State Memorandum of Agreement (DSMOA) to oversee the investigation and remediation of water quality issues at military facilities.

Date of Government Version: 05/05/2010  
Date Data Arrived at EDR: 05/05/2010  
Date Made Active in Reports: 05/18/2010  
Number of Days to Update: 13

Source: State Water Resources Control Board  
Telephone: 866-480-1028  
Last EDR Contact: 05/05/2010  
Next Scheduled EDR Contact: 07/05/2010  
Data Release Frequency: Quarterly

### Other Ascertainable Records

## GOVERNMENT RECORDS SEARCHED / DATA CURRENCY TRACKING

### RCRA-NonGen: RCRA - Non Generators

RCRAInfo is EPA's comprehensive information system, providing access to data supporting the Resource Conservation and Recovery Act (RCRA) of 1976 and the Hazardous and Solid Waste Amendments (HSWA) of 1984. The database includes selective information on sites which generate, transport, store, treat and/or dispose of hazardous waste as defined by the Resource Conservation and Recovery Act (RCRA). Non-Generators do not presently generate hazardous waste.

Date of Government Version: 02/17/2010	Source: Environmental Protection Agency
Date Data Arrived at EDR: 02/19/2010	Telephone: (415) 495-8895
Date Made Active in Reports: 05/17/2010	Last EDR Contact: 04/29/2010
Number of Days to Update: 87	Next Scheduled EDR Contact: 07/19/2010
	Data Release Frequency: Varies

### DOT OPS: Incident and Accident Data

Department of Transportation, Office of Pipeline Safety Incident and Accident data.

Date of Government Version: 01/12/2010	Source: Department of Transportation, Office of Pipeline Safety
Date Data Arrived at EDR: 02/09/2010	Telephone: 202-366-4595
Date Made Active in Reports: 04/12/2010	Last EDR Contact: 05/12/2010
Number of Days to Update: 62	Next Scheduled EDR Contact: 08/23/2010
	Data Release Frequency: Varies

### DOD: Department of Defense Sites

This data set consists of federally owned or administered lands, administered by the Department of Defense, that have any area equal to or greater than 640 acres of the United States, Puerto Rico, and the U.S. Virgin Islands.

Date of Government Version: 12/31/2005	Source: USGS
Date Data Arrived at EDR: 11/10/2006	Telephone: 703-692-8801
Date Made Active in Reports: 01/11/2007	Last EDR Contact: 04/21/2010
Number of Days to Update: 62	Next Scheduled EDR Contact: 08/02/2010
	Data Release Frequency: Semi-Annually

### FUDS: Formerly Used Defense Sites

The listing includes locations of Formerly Used Defense Sites properties where the US Army Corps of Engineers is actively working or will take necessary cleanup actions.

Date of Government Version: 12/31/2008	Source: U.S. Army Corps of Engineers
Date Data Arrived at EDR: 09/30/2009	Telephone: 202-528-4285
Date Made Active in Reports: 12/01/2009	Last EDR Contact: 03/18/2010
Number of Days to Update: 62	Next Scheduled EDR Contact: 06/28/2010
	Data Release Frequency: Varies

### CONSENT: Superfund (CERCLA) Consent Decrees

Major legal settlements that establish responsibility and standards for cleanup at NPL (Superfund) sites. Released periodically by United States District Courts after settlement by parties to litigation matters.

Date of Government Version: 04/11/2010	Source: Department of Justice, Consent Decree Library
Date Data Arrived at EDR: 04/19/2010	Telephone: Varies
Date Made Active in Reports: 05/17/2010	Last EDR Contact: 04/05/2010
Number of Days to Update: 28	Next Scheduled EDR Contact: 07/19/2010
	Data Release Frequency: Varies

### ROD: Records Of Decision

Record of Decision. ROD documents mandate a permanent remedy at an NPL (Superfund) site containing technical and health information to aid in the cleanup.

Date of Government Version: 04/29/2010	Source: EPA
Date Data Arrived at EDR: 05/07/2010	Telephone: 703-416-0223
Date Made Active in Reports: 05/27/2010	Last EDR Contact: 05/07/2010
Number of Days to Update: 20	Next Scheduled EDR Contact: 06/28/2010
	Data Release Frequency: Annually

## GOVERNMENT RECORDS SEARCHED / DATA CURRENCY TRACKING

### UMTRA: Uranium Mill Tailings Sites

Uranium ore was mined by private companies for federal government use in national defense programs. When the mills shut down, large piles of the sand-like material (mill tailings) remain after uranium has been extracted from the ore. Levels of human exposure to radioactive materials from the piles are low; however, in some cases tailings were used as construction materials before the potential health hazards of the tailings were recognized.

Date of Government Version: 01/05/2009	Source: Department of Energy
Date Data Arrived at EDR: 05/07/2009	Telephone: 505-845-0011
Date Made Active in Reports: 05/08/2009	Last EDR Contact: 01/21/2010
Number of Days to Update: 1	Next Scheduled EDR Contact: 06/14/2010
	Data Release Frequency: Varies

### MINES: Mines Master Index File

Contains all mine identification numbers issued for mines active or opened since 1971. The data also includes violation information.

Date of Government Version: 02/12/2010	Source: Department of Labor, Mine Safety and Health Administration
Date Data Arrived at EDR: 03/10/2010	Telephone: 303-231-5959
Date Made Active in Reports: 05/17/2010	Last EDR Contact: 03/10/2010
Number of Days to Update: 68	Next Scheduled EDR Contact: 06/21/2010
	Data Release Frequency: Semi-Annually

### TRIS: Toxic Chemical Release Inventory System

Toxic Release Inventory System. TRIS identifies facilities which release toxic chemicals to the air, water and land in reportable quantities under SARA Title III Section 313.

Date of Government Version: 12/31/2008	Source: EPA
Date Data Arrived at EDR: 01/13/2010	Telephone: 202-566-0250
Date Made Active in Reports: 02/18/2010	Last EDR Contact: 03/02/2010
Number of Days to Update: 36	Next Scheduled EDR Contact: 06/14/2010
	Data Release Frequency: Annually

### TSCA: Toxic Substances Control Act

Toxic Substances Control Act. TSCA identifies manufacturers and importers of chemical substances included on the TSCA Chemical Substance Inventory list. It includes data on the production volume of these substances by plant site.

Date of Government Version: 12/31/2002	Source: EPA
Date Data Arrived at EDR: 04/14/2006	Telephone: 202-260-5521
Date Made Active in Reports: 05/30/2006	Last EDR Contact: 04/21/2010
Number of Days to Update: 46	Next Scheduled EDR Contact: 07/12/2010
	Data Release Frequency: Every 4 Years

### FTTS: FIFRA/ TSCA Tracking System - FIFRA (Federal Insecticide, Fungicide, & Rodenticide Act)/TSCA (Toxic Substances Control Act)

FTTS tracks administrative cases and pesticide enforcement actions and compliance activities related to FIFRA, TSCA and EPCRA (Emergency Planning and Community Right-to-Know Act). To maintain currency, EDR contacts the Agency on a quarterly basis.

Date of Government Version: 04/09/2009	Source: EPA/Office of Prevention, Pesticides and Toxic Substances
Date Data Arrived at EDR: 04/16/2009	Telephone: 202-566-1667
Date Made Active in Reports: 05/11/2009	Last EDR Contact: 06/01/2010
Number of Days to Update: 25	Next Scheduled EDR Contact: 09/13/2010
	Data Release Frequency: Quarterly

### FTTS INSP: FIFRA/ TSCA Tracking System - FIFRA (Federal Insecticide, Fungicide, & Rodenticide Act)/TSCA (Toxic Substances Control Act) A listing of FIFRA/TSCA Tracking System (FTTS) inspections and enforcements.

Date of Government Version: 04/09/2009	Source: EPA
Date Data Arrived at EDR: 04/16/2009	Telephone: 202-566-1667
Date Made Active in Reports: 05/11/2009	Last EDR Contact: 06/01/2010
Number of Days to Update: 25	Next Scheduled EDR Contact: 09/13/2010
	Data Release Frequency: Quarterly



## GOVERNMENT RECORDS SEARCHED / DATA CURRENCY TRACKING

### HIST FTTS: FIFRA/TSCA Tracking System Administrative Case Listing

A complete administrative case listing from the FIFRA/TSCA Tracking System (FTTS) for all ten EPA regions. The information was obtained from the National Compliance Database (NCDB). NCDB supports the implementation of FIFRA (Federal Insecticide, Fungicide, and Rodenticide Act) and TSCA (Toxic Substances Control Act). Some EPA regions are now closing out records. Because of that, and the fact that some EPA regions are not providing EPA Headquarters with updated records, it was decided to create a HIST FTTS database. It included records that may not be included in the newer FTTS database updates. This database is no longer updated.

Date of Government Version: 10/19/2006	Source: Environmental Protection Agency
Date Data Arrived at EDR: 03/01/2007	Telephone: 202-564-2501
Date Made Active in Reports: 04/10/2007	Last EDR Contact: 12/17/2007
Number of Days to Update: 40	Next Scheduled EDR Contact: 03/17/2008
	Data Release Frequency: No Update Planned

### HIST FTTS INSP: FIFRA/TSCA Tracking System Inspection & Enforcement Case Listing

A complete inspection and enforcement case listing from the FIFRA/TSCA Tracking System (FTTS) for all ten EPA regions. The information was obtained from the National Compliance Database (NCDB). NCDB supports the implementation of FIFRA (Federal Insecticide, Fungicide, and Rodenticide Act) and TSCA (Toxic Substances Control Act). Some EPA regions are now closing out records. Because of that, and the fact that some EPA regions are not providing EPA Headquarters with updated records, it was decided to create a HIST FTTS database. It included records that may not be included in the newer FTTS database updates. This database is no longer updated.

Date of Government Version: 10/19/2006	Source: Environmental Protection Agency
Date Data Arrived at EDR: 03/01/2007	Telephone: 202-564-2501
Date Made Active in Reports: 04/10/2007	Last EDR Contact: 12/17/2008
Number of Days to Update: 40	Next Scheduled EDR Contact: 03/17/2008
	Data Release Frequency: No Update Planned

### SSTS: Section 7 Tracking Systems

Section 7 of the Federal Insecticide, Fungicide and Rodenticide Act, as amended (92 Stat. 829) requires all registered pesticide-producing establishments to submit a report to the Environmental Protection Agency by March 1st each year. Each establishment must report the types and amounts of pesticides, active ingredients and devices being produced, and those having been produced and sold or distributed in the past year.

Date of Government Version: 12/31/2008	Source: EPA
Date Data Arrived at EDR: 01/06/2010	Telephone: 202-564-4203
Date Made Active in Reports: 02/10/2010	Last EDR Contact: 05/03/2010
Number of Days to Update: 35	Next Scheduled EDR Contact: 08/16/2010
	Data Release Frequency: Annually

### ICIS: Integrated Compliance Information System

The Integrated Compliance Information System (ICIS) supports the information needs of the national enforcement and compliance program as well as the unique needs of the National Pollutant Discharge Elimination System (NPDES) program.

Date of Government Version: 04/24/2010	Source: Environmental Protection Agency
Date Data Arrived at EDR: 04/29/2010	Telephone: 202-564-5088
Date Made Active in Reports: 05/17/2010	Last EDR Contact: 03/29/2010
Number of Days to Update: 18	Next Scheduled EDR Contact: 07/12/2010
	Data Release Frequency: Quarterly

### PADS: PCB Activity Database System

PCB Activity Database. PADS identifies generators, transporters, commercial storers and/or brokers and disposers of PCB's who are required to notify the EPA of such activities.

Date of Government Version: 09/01/2009	Source: EPA
Date Data Arrived at EDR: 10/21/2009	Telephone: 202-566-0500
Date Made Active in Reports: 12/01/2009	Last EDR Contact: 04/22/2010
Number of Days to Update: 41	Next Scheduled EDR Contact: 08/02/2010
	Data Release Frequency: Annually

## GOVERNMENT RECORDS SEARCHED / DATA CURRENCY TRACKING

### MLTS: Material Licensing Tracking System

MLTS is maintained by the Nuclear Regulatory Commission and contains a list of approximately 8,100 sites which possess or use radioactive materials and which are subject to NRC licensing requirements. To maintain currency, EDR contacts the Agency on a quarterly basis.

Date of Government Version: 03/18/2010  
Date Data Arrived at EDR: 04/06/2010  
Date Made Active in Reports: 05/27/2010  
Number of Days to Update: 51

Source: Nuclear Regulatory Commission  
Telephone: 301-415-7169  
Last EDR Contact: 03/15/2010  
Next Scheduled EDR Contact: 06/28/2010  
Data Release Frequency: Quarterly

### RADINFO: Radiation Information Database

The Radiation Information Database (RADINFO) contains information about facilities that are regulated by U.S. Environmental Protection Agency (EPA) regulations for radiation and radioactivity.

Date of Government Version: 04/13/2010  
Date Data Arrived at EDR: 04/14/2010  
Date Made Active in Reports: 05/17/2010  
Number of Days to Update: 33

Source: Environmental Protection Agency  
Telephone: 202-343-9775  
Last EDR Contact: 04/14/2010  
Next Scheduled EDR Contact: 07/26/2010  
Data Release Frequency: Quarterly

### FINDS: Facility Index System/Facility Registry System

Facility Index System. FINDS contains both facility information and 'pointers' to other sources that contain more detail. EDR includes the following FINDS databases in this report: PCS (Permit Compliance System), AIRS (Aerometric Information Retrieval System), DOCKET (Enforcement Docket used to manage and track information on civil judicial enforcement cases for all environmental statutes), FURS (Federal Underground Injection Control), C-DOCKET (Criminal Docket System used to track criminal enforcement actions for all environmental statutes), FFIS (Federal Facilities Information System), STATE (State Environmental Laws and Statutes), and PADS (PCB Activity Data System).

Date of Government Version: 04/14/2010  
Date Data Arrived at EDR: 04/16/2010  
Date Made Active in Reports: 05/27/2010  
Number of Days to Update: 41

Source: EPA  
Telephone: (415) 947-8000  
Last EDR Contact: 03/15/2010  
Next Scheduled EDR Contact: 06/28/2010  
Data Release Frequency: Quarterly

### RAATS: RCRA Administrative Action Tracking System

RCRA Administration Action Tracking System. RAATS contains records based on enforcement actions issued under RCRA pertaining to major violators and includes administrative and civil actions brought by the EPA. For administration actions after September 30, 1995, data entry in the RAATS database was discontinued. EPA will retain a copy of the database for historical records. It was necessary to terminate RAATS because a decrease in agency resources made it impossible to continue to update the information contained in the database.

Date of Government Version: 04/17/1995  
Date Data Arrived at EDR: 07/03/1995  
Date Made Active in Reports: 08/07/1995  
Number of Days to Update: 35

Source: EPA  
Telephone: 202-564-4104  
Last EDR Contact: 06/02/2008  
Next Scheduled EDR Contact: 09/01/2008  
Data Release Frequency: No Update Planned

### BRS: Biennial Reporting System

The Biennial Reporting System is a national system administered by the EPA that collects data on the generation and management of hazardous waste. BRS captures detailed data from two groups: Large Quantity Generators (LQG) and Treatment, Storage, and Disposal Facilities.

Date of Government Version: 12/31/2007  
Date Data Arrived at EDR: 02/25/2010  
Date Made Active in Reports: 05/12/2010  
Number of Days to Update: 76

Source: EPA/NTIS  
Telephone: 800-424-9346  
Last EDR Contact: 05/25/2010  
Next Scheduled EDR Contact: 09/06/2010  
Data Release Frequency: Biennially



## GOVERNMENT RECORDS SEARCHED / DATA CURRENCY TRACKING

### CA BOND EXP. PLAN: Bond Expenditure Plan

Department of Health Services developed a site-specific expenditure plan as the basis for an appropriation of Hazardous Substance Cleanup Bond Act funds. It is not updated.

Date of Government Version: 01/01/1989

Date Data Arrived at EDR: 07/27/1994

Date Made Active in Reports: 08/02/1994

Number of Days to Update: 6

Source: Department of Health Services

Telephone: 916-255-2118

Last EDR Contact: 05/31/1994

Next Scheduled EDR Contact: N/A

Data Release Frequency: No Update Planned

### CA WDS: Waste Discharge System

Sites which have been issued waste discharge requirements.

Date of Government Version: 06/19/2007

Date Data Arrived at EDR: 06/20/2007

Date Made Active in Reports: 06/29/2007

Number of Days to Update: 9

Source: State Water Resources Control Board

Telephone: 916-341-5227

Last EDR Contact: 06/01/2010

Next Scheduled EDR Contact: 09/13/2010

Data Release Frequency: Quarterly

### NPDES: NPDES Permits Listing

A listing of NPDES permits, including stormwater.

Date of Government Version: 02/22/2010

Date Data Arrived at EDR: 02/24/2010

Date Made Active in Reports: 03/04/2010

Number of Days to Update: 8

Source: State Water Resources Control Board

Telephone: 916-445-9379

Last EDR Contact: 05/25/2010

Next Scheduled EDR Contact: 09/06/2010

Data Release Frequency: Quarterly

### CORTESE: "Cortese" Hazardous Waste & Substances Sites List

The sites for the list are designated by the State Water Resource Control Board (LUST), the Integrated Waste Board (SWF/LS), and the Department of Toxic Substances Control (Cal-Sites). This listing is no longer updated by the state agency.

Date of Government Version: 04/05/2010

Date Data Arrived at EDR: 04/07/2010

Date Made Active in Reports: 05/18/2010

Number of Days to Update: 41

Source: CAL EPA/Office of Emergency Information

Telephone: 916-323-3400

Last EDR Contact: 04/07/2010

Next Scheduled EDR Contact: 07/19/2010

Data Release Frequency: Quarterly

### HIST CORTESE: Hazardous Waste & Substance Site List

The sites for the list are designated by the State Water Resource Control Board [LUST], the Integrated Waste Board [SWF/LS], and the Department of Toxic Substances Control [CALSITES].

Date of Government Version: 04/01/2001

Date Data Arrived at EDR: 01/22/2009

Date Made Active in Reports: 04/08/2009

Number of Days to Update: 76

Source: Department of Toxic Substances Control

Telephone: 916-323-3400

Last EDR Contact: 01/22/2009

Next Scheduled EDR Contact: N/A

Data Release Frequency: No Update Planned

### NOTIFY 65: Proposition 65 Records

Proposition 65 Notification Records. NOTIFY 65 contains facility notifications about any release which could impact drinking water and thereby expose the public to a potential health risk.

Date of Government Version: 10/21/1993

Date Data Arrived at EDR: 11/01/1993

Date Made Active in Reports: 11/19/1993

Number of Days to Update: 18

Source: State Water Resources Control Board

Telephone: 916-445-3846

Last EDR Contact: 03/29/2010

Next Scheduled EDR Contact: 07/12/2010

Data Release Frequency: No Update Planned



## GOVERNMENT RECORDS SEARCHED / DATA CURRENCY TRACKING

### DRYCLEANERS: Cleaner Facilities

A list of drycleaner related facilities that have EPA ID numbers. These are facilities with certain SIC codes: power laundries, family and commercial; garment pressing and cleaner's agents; linen supply; coin-operated laundries and cleaning; drycleaning plants, except rugs; carpet and upholster cleaning; industrial launderers; laundry and garment services.

Date of Government Version: 12/22/2009  
Date Data Arrived at EDR: 01/25/2010  
Date Made Active in Reports: 01/29/2010  
Number of Days to Update: 4

Source: Department of Toxic Substance Control  
Telephone: 916-327-4498  
Last EDR Contact: 03/15/2010  
Next Scheduled EDR Contact: 06/28/2010  
Data Release Frequency: Annually

### WIP: Well Investigation Program Case List

Well Investigation Program case in the San Gabriel and San Fernando Valley area.

Date of Government Version: 07/03/2009  
Date Data Arrived at EDR: 07/21/2009  
Date Made Active in Reports: 08/03/2009  
Number of Days to Update: 13

Source: Los Angeles Water Quality Control Board  
Telephone: 213-576-6726  
Last EDR Contact: 04/14/2010  
Next Scheduled EDR Contact: 07/19/2010  
Data Release Frequency: Varies

### HAZNET: Facility and Manifest Data

Facility and Manifest Data. The data is extracted from the copies of hazardous waste manifests received each year by the DTSC. The annual volume of manifests is typically 700,000 - 1,000,000 annually, representing approximately 350,000 - 500,000 shipments. Data are from the manifests submitted without correction, and therefore many contain some invalid values for data elements such as generator ID, TSD ID, waste category, and disposal method.

Date of Government Version: 12/31/2008  
Date Data Arrived at EDR: 10/21/2009  
Date Made Active in Reports: 10/28/2009  
Number of Days to Update: 7

Source: California Environmental Protection Agency  
Telephone: 916-255-1136  
Last EDR Contact: 04/26/2010  
Next Scheduled EDR Contact: 08/02/2010  
Data Release Frequency: Annually

### EMI: Emissions Inventory Data

Toxics and criteria pollutant emissions data collected by the ARB and local air pollution agencies.

Date of Government Version: 12/31/2007  
Date Data Arrived at EDR: 07/14/2009  
Date Made Active in Reports: 07/23/2009  
Number of Days to Update: 9

Source: California Air Resources Board  
Telephone: 916-322-2990  
Last EDR Contact: 04/09/2010  
Next Scheduled EDR Contact: 07/12/2010  
Data Release Frequency: Varies

### INDIAN RESERV: Indian Reservations

This map layer portrays Indian administered lands of the United States that have any area equal to or greater than 640 acres.

Date of Government Version: 12/31/2005  
Date Data Arrived at EDR: 12/08/2006  
Date Made Active in Reports: 01/11/2007  
Number of Days to Update: 34

Source: USGS  
Telephone: 202-208-3710  
Last EDR Contact: 04/21/2010  
Next Scheduled EDR Contact: 08/02/2010  
Data Release Frequency: Semi-Annually

### SCRD DRYCLEANERS: State Coalition for Remediation of Drycleaners Listing

The State Coalition for Remediation of Drycleaners was established in 1998, with support from the U.S. EPA Office of Superfund Remediation and Technology Innovation. It is comprised of representatives of states with established drycleaner remediation programs. Currently the member states are Alabama, Connecticut, Florida, Illinois, Kansas, Minnesota, Missouri, North Carolina, Oregon, South Carolina, Tennessee, Texas, and Wisconsin.

Date of Government Version: 02/10/2010  
Date Data Arrived at EDR: 02/11/2010  
Date Made Active in Reports: 04/12/2010  
Number of Days to Update: 60

Source: Environmental Protection Agency  
Telephone: 615-532-8599  
Last EDR Contact: 05/10/2010  
Next Scheduled EDR Contact: 08/09/2010  
Data Release Frequency: Varies

## GOVERNMENT RECORDS SEARCHED / DATA CURRENCY TRACKING

### PROC: Certified Processors Database

A listing of certified processors.

Date of Government Version: 01/06/2010  
Date Data Arrived at EDR: 03/24/2010  
Date Made Active in Reports: 04/09/2010  
Number of Days to Update: 16

Source: Department of Conservation  
Telephone: 916-323-3836  
Last EDR Contact: 03/24/2010  
Next Scheduled EDR Contact: 07/05/2010  
Data Release Frequency: Quarterly

### MWMP: Medical Waste Management Program Listing

The Medical Waste Management Program (MWMP) ensures the proper handling and disposal of medical waste by permitting and inspecting medical waste Offsite Treatment Facilities (PDF) and Transfer Stations (PDF) throughout the state. MWMP also oversees all Medical Waste Transporters.

Date of Government Version: 02/24/2010  
Date Data Arrived at EDR: 03/17/2010  
Date Made Active in Reports: 04/09/2010  
Number of Days to Update: 23

Source: Department of Public Health  
Telephone: 916-558-1784  
Last EDR Contact: 03/15/2010  
Next Scheduled EDR Contact: 06/28/2010  
Data Release Frequency: Varies

### COAL ASH DOE: Steam-Electric Plan Operation Data

A listing of power plants that store ash in surface ponds.

Date of Government Version: 12/31/2005  
Date Data Arrived at EDR: 08/07/2009  
Date Made Active in Reports: 10/22/2009  
Number of Days to Update: 76

Source: Department of Energy  
Telephone: 202-586-8719  
Last EDR Contact: 04/21/2010  
Next Scheduled EDR Contact: 08/02/2010  
Data Release Frequency: Varies

### COAL ASH EPA: Coal Combustion Residues Surface Impoundments List

A listing of coal combustion residues surface impoundments with high hazard potential ratings.

Date of Government Version: 11/09/2009  
Date Data Arrived at EDR: 12/18/2009  
Date Made Active in Reports: 02/10/2010  
Number of Days to Update: 54

Source: Environmental Protection Agency  
Telephone: N/A  
Last EDR Contact: 03/16/2010  
Next Scheduled EDR Contact: 06/28/2010  
Data Release Frequency: Varies

### HWT: Registered Hazardous Waste Transporter Database

A listing of hazardous waste transporters. In California, unless specifically exempted, it is unlawful for any person to transport hazardous wastes unless the person holds a valid registration issued by DTSC. A hazardous waste transporter registration is valid for one year and is assigned a unique registration number.

Date of Government Version: 04/21/2010  
Date Data Arrived at EDR: 04/21/2010  
Date Made Active in Reports: 05/18/2010  
Number of Days to Update: 27

Source: Department of Toxic Substances Control  
Telephone: 916-440-7145  
Last EDR Contact: 04/21/2010  
Next Scheduled EDR Contact: 08/02/2010  
Data Release Frequency: Quarterly

### HWP: EnviroStor Permitted Facilities Listing

Detailed information on permitted hazardous waste facilities and corrective action (a??cleanupsa??) tracked in EnviroStor.

Date of Government Version: 05/11/2010  
Date Data Arrived at EDR: 05/12/2010  
Date Made Active in Reports: 05/18/2010  
Number of Days to Update: 6

Source: Department of Toxic Substances Control  
Telephone: 916-323-3400  
Last EDR Contact: 05/12/2010  
Next Scheduled EDR Contact: 08/23/2010  
Data Release Frequency: Quarterly

## GOVERNMENT RECORDS SEARCHED / DATA CURRENCY TRACKING

### FINANCIAL ASSURANCE 2: Financial Assurance Information Listing

A listing of financial assurance information for solid waste facilities. Financial assurance is intended to ensure that resources are available to pay for the cost of closure, post-closure care, and corrective measures if the owner or operator of a regulated facility is unable or unwilling to pay.

Date of Government Version: 03/09/2010	Source: California Integrated Waste Management Board
Date Data Arrived at EDR: 03/10/2010	Telephone: 916-341-6066
Date Made Active in Reports: 04/09/2010	Last EDR Contact: 05/24/2010
Number of Days to Update: 30	Next Scheduled EDR Contact: 09/06/2010
	Data Release Frequency: Varies

### FINANCIAL ASSURANCE: Financial Assurance Information Listing

Financial Assurance information

Date of Government Version: 03/01/2007	Source: Department of Toxic Substances Control
Date Data Arrived at EDR: 06/01/2007	Telephone: 916-255-3628
Date Made Active in Reports: 06/29/2007	Last EDR Contact: 05/05/2010
Number of Days to Update: 28	Next Scheduled EDR Contact: 08/16/2010
	Data Release Frequency: Varies

### FEDLAND: Federal and Indian Lands

Federally and Indian administrated lands of the United States. Lands included are administrated by: Army Corps of Engineers, Bureau of Reclamation, National Wild and Scenic River, National Wildlife Refuge, Public Domain Land, Wilderness, Wilderness Study Area, Wildlife Management Area, Bureau of Indian Affairs, Bureau of Land Management, Department of Justice, Forest Service, Fish and Wildlife Service, National Park Service.

Date of Government Version: 12/31/2005	Source: U.S. Geological Survey
Date Data Arrived at EDR: 02/06/2006	Telephone: 888-275-8747
Date Made Active in Reports: 01/11/2007	Last EDR Contact: 04/21/2010
Number of Days to Update: 339	Next Scheduled EDR Contact: 08/02/2010
	Data Release Frequency: N/A

### PCB TRANSFORMER: PCB Transformer Registration Database

The database of PCB transformer registrations that includes all PCB registration submittals.

Date of Government Version: 01/01/2008	Source: Environmental Protection Agency
Date Data Arrived at EDR: 02/18/2009	Telephone: 202-566-0517
Date Made Active in Reports: 05/29/2009	Last EDR Contact: 05/14/2010
Number of Days to Update: 100	Next Scheduled EDR Contact: 08/16/2010
	Data Release Frequency: Varies

### EDR PROPRIETARY RECORDS

#### *EDR Proprietary Records*

#### Manufactured Gas Plants: EDR Proprietary Manufactured Gas Plants

The EDR Proprietary Manufactured Gas Plant Database includes records of coal gas plants (manufactured gas plants) compiled by EDR's researchers. Manufactured gas sites were used in the United States from the 1800's to 1950's to produce a gas that could be distributed and used as fuel. These plants used whale oil, rosin, coal, or a mixture of coal, oil, and water that also produced a significant amount of waste. Many of the byproducts of the gas production, such as coal tar (oily waste containing volatile and non-volatile chemicals), sludges, oils and other compounds are potentially hazardous to human health and the environment. The byproduct from this process was frequently disposed of directly at the plant site and can remain or spread slowly, serving as a continuous source of soil and groundwater contamination.

Date of Government Version: N/A	Source: EDR, Inc.
Date Data Arrived at EDR: N/A	Telephone: N/A
Date Made Active in Reports: N/A	Last EDR Contact: N/A
Number of Days to Update: N/A	Next Scheduled EDR Contact: N/A
	Data Release Frequency: No Update Planned



## GOVERNMENT RECORDS SEARCHED / DATA CURRENCY TRACKING

### EDR Historical Auto Stations: EDR Proprietary Historic Gas Stations

EDR has searched selected national collections of business directories and has collected listings of potential gas station/filling station/service station sites that were available to EDR researchers. EDR's review was limited to those categories of sources that might, in EDR's opinion, include gas station/filling station/service station establishments. The categories reviewed included, but were not limited to gas, gas station, gasoline station, filling station, auto, automobile repair, auto service station, service station, etc.

Date of Government Version: N/A	Source: EDR, Inc.
Date Data Arrived at EDR: N/A	Telephone: N/A
Date Made Active in Reports: N/A	Last EDR Contact: N/A
Number of Days to Update: N/A	Next Scheduled EDR Contact: N/A
	Data Release Frequency: Varies

### EDR Historical Cleaners: EDR Proprietary Historic Dry Cleaners

EDR has searched selected national collections of business directories and has collected listings of potential dry cleaner sites that were available to EDR researchers. EDR's review was limited to those categories of sources that might, in EDR's opinion, include dry cleaning establishments. The categories reviewed included, but were not limited to dry cleaners, cleaners, laundry, laundromat, cleaning/laundry, wash & dry etc.

Date of Government Version: N/A	Source: EDR, Inc.
Date Data Arrived at EDR: N/A	Telephone: N/A
Date Made Active in Reports: N/A	Last EDR Contact: N/A
Number of Days to Update: N/A	Next Scheduled EDR Contact: N/A
	Data Release Frequency: Varies

## COUNTY RECORDS

### ALAMEDA COUNTY:

#### Contaminated Sites

A listing of contaminated sites overseen by the Toxic Release Program (oil and groundwater contamination from chemical releases and spills) and the Leaking Underground Storage Tank Program (soil and ground water contamination from leaking petroleum USTs).

Date of Government Version: 04/12/2010	Source: Alameda County Environmental Health Services
Date Data Arrived at EDR: 04/14/2010	Telephone: 510-567-6700
Date Made Active in Reports: 05/18/2010	Last EDR Contact: 04/05/2010
Number of Days to Update: 34	Next Scheduled EDR Contact: 07/19/2010
	Data Release Frequency: Semi-Annually

#### Underground Tanks

Underground storage tank sites located in Alameda county.

Date of Government Version: 04/12/2010	Source: Alameda County Environmental Health Services
Date Data Arrived at EDR: 04/14/2010	Telephone: 510-567-6700
Date Made Active in Reports: 05/18/2010	Last EDR Contact: 04/05/2010
Number of Days to Update: 34	Next Scheduled EDR Contact: 07/19/2010
	Data Release Frequency: Semi-Annually

### CONTRA COSTA COUNTY:

#### Site List

List includes sites from the underground tank, hazardous waste generator and business plan/2185 programs.

Date of Government Version: 02/10/2010	Source: Contra Costa Health Services Department
Date Data Arrived at EDR: 02/11/2010	Telephone: 925-646-2286
Date Made Active in Reports: 02/18/2010	Last EDR Contact: 05/24/2010
Number of Days to Update: 7	Next Scheduled EDR Contact: 08/23/2010
	Data Release Frequency: Semi-Annually

### FRESNO COUNTY:

## GOVERNMENT RECORDS SEARCHED / DATA CURRENCY TRACKING

### CUPA Resources List

Certified Unified Program Agency. CUPA's are responsible for implementing a unified hazardous materials and hazardous waste management regulatory program. The agency provides oversight of businesses that deal with hazardous materials, operate underground storage tanks or aboveground storage tanks.

Date of Government Version: 04/15/2010  
Date Data Arrived at EDR: 04/16/2010  
Date Made Active in Reports: 05/18/2010  
Number of Days to Update: 32

Source: Dept. of Community Health  
Telephone: 559-445-3271  
Last EDR Contact: 04/16/2010  
Next Scheduled EDR Contact: 08/02/2010  
Data Release Frequency: Semi-Annually

### KERN COUNTY:

#### Underground Storage Tank Sites & Tank Listing

Kern County Sites and Tanks Listing.

Date of Government Version: 03/16/2010  
Date Data Arrived at EDR: 03/17/2010  
Date Made Active in Reports: 04/14/2010  
Number of Days to Update: 28

Source: Kern County Environment Health Services Department  
Telephone: 661-862-8700  
Last EDR Contact: 05/17/2010  
Next Scheduled EDR Contact: 08/30/2010  
Data Release Frequency: Quarterly

### LOS ANGELES COUNTY:

#### San Gabriel Valley Areas of Concern

San Gabriel Valley areas where VOC contamination is at or above the MCL as designated by region 9 EPA office.

Date of Government Version: 03/30/2009  
Date Data Arrived at EDR: 03/31/2009  
Date Made Active in Reports: 10/23/2009  
Number of Days to Update: 206

Source: EPA Region 9  
Telephone: 415-972-3178  
Last EDR Contact: 03/29/2010  
Next Scheduled EDR Contact: 07/12/2010  
Data Release Frequency: No Update Planned

#### HMS: Street Number List

Industrial Waste and Underground Storage Tank Sites.

Date of Government Version: 12/31/2009  
Date Data Arrived at EDR: 04/13/2010  
Date Made Active in Reports: 05/18/2010  
Number of Days to Update: 35

Source: Department of Public Works  
Telephone: 626-458-3517  
Last EDR Contact: 04/19/2010  
Next Scheduled EDR Contact: 08/02/2010  
Data Release Frequency: Semi-Annually

#### List of Solid Waste Facilities

Solid Waste Facilities in Los Angeles County.

Date of Government Version: 04/23/2010  
Date Data Arrived at EDR: 04/26/2010  
Date Made Active in Reports: 05/18/2010  
Number of Days to Update: 22

Source: La County Department of Public Works  
Telephone: 818-458-5185  
Last EDR Contact: 04/23/2010  
Next Scheduled EDR Contact: 08/09/2010  
Data Release Frequency: Varies

#### City of Los Angeles Landfills

Landfills owned and maintained by the City of Los Angeles.

Date of Government Version: 03/05/2009  
Date Data Arrived at EDR: 03/10/2009  
Date Made Active in Reports: 04/08/2009  
Number of Days to Update: 29

Source: Engineering & Construction Division  
Telephone: 213-473-7869  
Last EDR Contact: 05/27/2010  
Next Scheduled EDR Contact: 09/06/2010  
Data Release Frequency: Varies

## GOVERNMENT RECORDS SEARCHED / DATA CURRENCY TRACKING

### Site Mitigation List

Industrial sites that have had some sort of spill or complaint.

Date of Government Version: 02/09/2010	Source: Community Health Services
Date Data Arrived at EDR: 02/12/2010	Telephone: 323-890-7806
Date Made Active in Reports: 03/04/2010	Last EDR Contact: 04/22/2010
Number of Days to Update: 20	Next Scheduled EDR Contact: 08/09/2010
	Data Release Frequency: Annually

### City of El Segundo Underground Storage Tank

Underground storage tank sites located in El Segundo city.

Date of Government Version: 04/28/2010	Source: City of El Segundo Fire Department
Date Data Arrived at EDR: 04/29/2010	Telephone: 310-524-2236
Date Made Active in Reports: 05/18/2010	Last EDR Contact: 04/23/2010
Number of Days to Update: 19	Next Scheduled EDR Contact: 08/09/2010
	Data Release Frequency: Semi-Annually

### City of Long Beach Underground Storage Tank

Underground storage tank sites located in the city of Long Beach.

Date of Government Version: 03/28/2003	Source: City of Long Beach Fire Department
Date Data Arrived at EDR: 10/23/2003	Telephone: 562-570-2563
Date Made Active in Reports: 11/26/2003	Last EDR Contact: 05/03/2010
Number of Days to Update: 34	Next Scheduled EDR Contact: 08/16/2010
	Data Release Frequency: Annually

### City of Torrance Underground Storage Tank

Underground storage tank sites located in the city of Torrance.

Date of Government Version: 04/19/2010	Source: City of Torrance Fire Department
Date Data Arrived at EDR: 04/21/2010	Telephone: 310-618-2973
Date Made Active in Reports: 05/18/2010	Last EDR Contact: 04/19/2010
Number of Days to Update: 27	Next Scheduled EDR Contact: 08/02/2010
	Data Release Frequency: Semi-Annually

### MARIN COUNTY:

#### Underground Storage Tank Sites

Currently permitted USTs in Marin County.

Date of Government Version: 04/19/2010	Source: Public Works Department Waste Management
Date Data Arrived at EDR: 04/30/2010	Telephone: 415-499-6647
Date Made Active in Reports: 05/18/2010	Last EDR Contact: 04/12/2010
Number of Days to Update: 18	Next Scheduled EDR Contact: 07/26/2010
	Data Release Frequency: Semi-Annually

### NAPA COUNTY:

#### Sites With Reported Contamination

A listing of leaking underground storage tank sites located in Napa county.

Date of Government Version: 07/09/2008	Source: Napa County Department of Environmental Management
Date Data Arrived at EDR: 07/09/2008	Telephone: 707-253-4269
Date Made Active in Reports: 07/31/2008	Last EDR Contact: 03/08/2010
Number of Days to Update: 22	Next Scheduled EDR Contact: 06/21/2010
	Data Release Frequency: No Update Planned



## GOVERNMENT RECORDS SEARCHED / DATA CURRENCY TRACKING

### Closed and Operating Underground Storage Tank Sites

Underground storage tank sites located in Napa county.

Date of Government Version: 01/15/2008  
Date Data Arrived at EDR: 01/16/2008  
Date Made Active in Reports: 02/08/2008  
Number of Days to Update: 23

Source: Napa County Department of Environmental Management  
Telephone: 707-253-4269  
Last EDR Contact: 03/08/2010  
Next Scheduled EDR Contact: 06/21/2010  
Data Release Frequency: No Update Planned

### ORANGE COUNTY:

#### List of Industrial Site Cleanups

Petroleum and non-petroleum spills.

Date of Government Version: 12/02/2009  
Date Data Arrived at EDR: 02/16/2010  
Date Made Active in Reports: 03/04/2010  
Number of Days to Update: 16

Source: Health Care Agency  
Telephone: 714-834-3446  
Last EDR Contact: 05/18/2010  
Next Scheduled EDR Contact: 08/30/2010  
Data Release Frequency: Annually

#### List of Underground Storage Tank Cleanups

Orange County Underground Storage Tank Cleanups (LUST).

Date of Government Version: 02/03/2010  
Date Data Arrived at EDR: 02/16/2010  
Date Made Active in Reports: 03/04/2010  
Number of Days to Update: 16

Source: Health Care Agency  
Telephone: 714-834-3446  
Last EDR Contact: 05/18/2010  
Next Scheduled EDR Contact: 08/30/2010  
Data Release Frequency: Quarterly

#### List of Underground Storage Tank Facilities

Orange County Underground Storage Tank Facilities (UST).

Date of Government Version: 02/03/2010  
Date Data Arrived at EDR: 02/12/2010  
Date Made Active in Reports: 02/23/2010  
Number of Days to Update: 11

Source: Health Care Agency  
Telephone: 714-834-3446  
Last EDR Contact: 05/28/2010  
Next Scheduled EDR Contact: 08/30/2010  
Data Release Frequency: Quarterly

### PLACER COUNTY:

#### Master List of Facilities

List includes aboveground tanks, underground tanks and cleanup sites.

Date of Government Version: 03/16/2010  
Date Data Arrived at EDR: 03/17/2010  
Date Made Active in Reports: 04/09/2010  
Number of Days to Update: 23

Source: Placer County Health and Human Services  
Telephone: 530-889-7312  
Last EDR Contact: 03/15/2010  
Next Scheduled EDR Contact: 06/28/2010  
Data Release Frequency: Semi-Annually

### RIVERSIDE COUNTY:

#### Listing of Underground Tank Cleanup Sites

Riverside County Underground Storage Tank Cleanup Sites (LUST).

Date of Government Version: 04/19/2010  
Date Data Arrived at EDR: 04/19/2010  
Date Made Active in Reports: 05/18/2010  
Number of Days to Update: 29

Source: Department of Public Health  
Telephone: 951-358-5055  
Last EDR Contact: 03/29/2010  
Next Scheduled EDR Contact: 07/12/2010  
Data Release Frequency: Quarterly

## GOVERNMENT RECORDS SEARCHED / DATA CURRENCY TRACKING

### Underground Storage Tank Tank List

Underground storage tank sites located in Riverside county.

Date of Government Version: 04/19/2010	Source: Health Services Agency
Date Data Arrived at EDR: 04/19/2010	Telephone: 951-358-5055
Date Made Active in Reports: 05/18/2010	Last EDR Contact: 03/29/2010
Number of Days to Update: 29	Next Scheduled EDR Contact: 07/12/2010
	Data Release Frequency: Quarterly

### SACRAMENTO COUNTY:

#### Toxic Site Clean-Up List

List of sites where unauthorized releases of potentially hazardous materials have occurred.

Date of Government Version: 04/01/2010	Source: Sacramento County Environmental Management
Date Data Arrived at EDR: 04/15/2010	Telephone: 916-875-8406
Date Made Active in Reports: 05/18/2010	Last EDR Contact: 04/12/2010
Number of Days to Update: 33	Next Scheduled EDR Contact: 07/26/2010
	Data Release Frequency: Quarterly

#### Master Hazardous Materials Facility List

Any business that has hazardous materials on site - hazardous material storage sites, underground storage tanks, waste generators.

Date of Government Version: 03/03/2010	Source: Sacramento County Environmental Management
Date Data Arrived at EDR: 04/16/2010	Telephone: 916-875-8406
Date Made Active in Reports: 05/18/2010	Last EDR Contact: 04/12/2010
Number of Days to Update: 32	Next Scheduled EDR Contact: 07/26/2010
	Data Release Frequency: Quarterly

### SAN BERNARDINO COUNTY:

#### Hazardous Material Permits

This listing includes underground storage tanks, medical waste handlers/generators, hazardous materials handlers, hazardous waste generators, and waste oil generators/handlers.

Date of Government Version: 03/16/2010	Source: San Bernardino County Fire Department Hazardous Materials Division
Date Data Arrived at EDR: 03/17/2010	Telephone: 909-387-3041
Date Made Active in Reports: 04/09/2010	Last EDR Contact: 05/17/2010
Number of Days to Update: 23	Next Scheduled EDR Contact: 08/30/2010
	Data Release Frequency: Quarterly

### SAN DIEGO COUNTY:

#### Hazardous Materials Management Division Database

The database includes: HE58 - This report contains the business name, site address, business phone number, establishment 'H' permit number, type of permit, and the business status. HE17 - In addition to providing the same information provided in the HE58 listing, HE17 provides inspection dates, violations received by the establishment, hazardous waste generated, the quantity, method of storage, treatment/disposal of waste and the hauler, and information on underground storage tanks. Unauthorized Release List - Includes a summary of environmental contamination cases in San Diego County (underground tank cases, non-tank cases, groundwater contamination, and soil contamination are included.)

Date of Government Version: 07/16/2008	Source: Hazardous Materials Management Division
Date Data Arrived at EDR: 10/29/2008	Telephone: 619-338-2268
Date Made Active in Reports: 11/26/2008	Last EDR Contact: 03/31/2010
Number of Days to Update: 28	Next Scheduled EDR Contact: 06/28/2010
	Data Release Frequency: Quarterly

## GOVERNMENT RECORDS SEARCHED / DATA CURRENCY TRACKING

### Solid Waste Facilities

San Diego County Solid Waste Facilities.

Date of Government Version: 10/01/2009  
Date Data Arrived at EDR: 12/04/2009  
Date Made Active in Reports: 01/18/2010  
Number of Days to Update: 45

Source: Department of Health Services  
Telephone: 619-338-2209  
Last EDR Contact: 05/03/2010  
Next Scheduled EDR Contact: 08/16/2010  
Data Release Frequency: Varies

### Environmental Case Listing

The listing contains all underground tank release cases and projects pertaining to properties contaminated with hazardous substances that are actively under review by the Site Assessment and Mitigation Program.

Date of Government Version: 09/23/2009  
Date Data Arrived at EDR: 12/15/2009  
Date Made Active in Reports: 01/18/2010  
Number of Days to Update: 34

Source: San Diego County Department of Environmental Health  
Telephone: 619-338-2371  
Last EDR Contact: 03/16/2010  
Next Scheduled EDR Contact: 06/28/2010  
Data Release Frequency: Varies

### SAN FRANCISCO COUNTY:

#### Local Oversight Facilities

A listing of leaking underground storage tank sites located in San Francisco county.

Date of Government Version: 09/19/2008  
Date Data Arrived at EDR: 09/19/2008  
Date Made Active in Reports: 09/29/2008  
Number of Days to Update: 10

Source: Department Of Public Health San Francisco County  
Telephone: 415-252-3920  
Last EDR Contact: 05/17/2010  
Next Scheduled EDR Contact: 08/30/2010  
Data Release Frequency: Quarterly

#### Underground Storage Tank Information

Underground storage tank sites located in San Francisco county.

Date of Government Version: 03/26/2010  
Date Data Arrived at EDR: 04/30/2010  
Date Made Active in Reports: 05/10/2010  
Number of Days to Update: 10

Source: Department of Public Health  
Telephone: 415-252-3920  
Last EDR Contact: 05/17/2010  
Next Scheduled EDR Contact: 08/30/2010  
Data Release Frequency: Quarterly

### SAN JOAQUIN COUNTY:

#### San Joaquin Co. UST

A listing of underground storage tank locations in San Joaquin county.

Date of Government Version: 10/14/2009  
Date Data Arrived at EDR: 10/15/2009  
Date Made Active in Reports: 11/02/2009  
Number of Days to Update: 18

Source: Environmental Health Department  
Telephone: N/A  
Last EDR Contact: 03/29/2010  
Next Scheduled EDR Contact: 07/12/2010  
Data Release Frequency: Semi-Annually

### SAN MATEO COUNTY:

#### Business Inventory

List includes Hazardous Materials Business Plan, hazardous waste generators, and underground storage tanks.

Date of Government Version: 04/20/2010  
Date Data Arrived at EDR: 04/21/2010  
Date Made Active in Reports: 05/18/2010  
Number of Days to Update: 27

Source: San Mateo County Environmental Health Services Division  
Telephone: 650-363-1921  
Last EDR Contact: 03/22/2010  
Next Scheduled EDR Contact: 07/05/2010  
Data Release Frequency: Annually



## GOVERNMENT RECORDS SEARCHED / DATA CURRENCY TRACKING

### Fuel Leak List

A listing of leaking underground storage tank sites located in San Mateo county.

Date of Government Version: 03/22/2010	Source: San Mateo County Environmental Health Services Division
Date Data Arrived at EDR: 03/23/2010	Telephone: 650-363-1921
Date Made Active in Reports: 04/09/2010	Last EDR Contact: 03/22/2010
Number of Days to Update: 17	Next Scheduled EDR Contact: 07/05/2010
	Data Release Frequency: Semi-Annually

### SANTA CLARA COUNTY:

#### HIST LUST - Fuel Leak Site Activity Report

A listing of open and closed leaking underground storage tanks. This listing is no longer updated by the county. Leaking underground storage tanks are now handled by the Department of Environmental Health.

Date of Government Version: 03/29/2005	Source: Santa Clara Valley Water District
Date Data Arrived at EDR: 03/30/2005	Telephone: 408-265-2600
Date Made Active in Reports: 04/21/2005	Last EDR Contact: 03/23/2009
Number of Days to Update: 22	Next Scheduled EDR Contact: 06/22/2009
	Data Release Frequency: No Update Planned

#### LOP Listing

A listing of leaking underground storage tanks located in Santa Clara county.

Date of Government Version: 05/29/2009	Source: Department of Environmental Health
Date Data Arrived at EDR: 06/01/2009	Telephone: 408-918-3417
Date Made Active in Reports: 06/15/2009	Last EDR Contact: 03/08/2010
Number of Days to Update: 14	Next Scheduled EDR Contact: 06/21/2010
	Data Release Frequency: Annually

#### Hazardous Material Facilities

Hazardous material facilities, including underground storage tank sites.

Date of Government Version: 08/31/2009	Source: City of San Jose Fire Department
Date Data Arrived at EDR: 08/31/2009	Telephone: 408-277-4659
Date Made Active in Reports: 09/18/2009	Last EDR Contact: 06/01/2010
Number of Days to Update: 18	Next Scheduled EDR Contact: 08/30/2010
	Data Release Frequency: Annually

### SOLANO COUNTY:

#### Leaking Underground Storage Tanks

A listing of leaking underground storage tank sites located in Solano county.

Date of Government Version: 03/11/2010	Source: Solano County Department of Environmental Management
Date Data Arrived at EDR: 03/16/2010	Telephone: 707-784-6770
Date Made Active in Reports: 04/09/2010	Last EDR Contact: 03/08/2010
Number of Days to Update: 24	Next Scheduled EDR Contact: 06/21/2010
	Data Release Frequency: Quarterly

#### Underground Storage Tanks

Underground storage tank sites located in Solano county.

Date of Government Version: 03/11/2010	Source: Solano County Department of Environmental Management
Date Data Arrived at EDR: 03/16/2010	Telephone: 707-784-6770
Date Made Active in Reports: 04/14/2010	Last EDR Contact: 03/08/2010
Number of Days to Update: 29	Next Scheduled EDR Contact: 06/21/2010
	Data Release Frequency: Quarterly

### SONOMA COUNTY:

## GOVERNMENT RECORDS SEARCHED / DATA CURRENCY TRACKING

### Leaking Underground Storage Tank Sites

A listing of leaking underground storage tank sites located in Sonoma county.

Date of Government Version: 04/06/2010  
Date Data Arrived at EDR: 04/07/2010  
Date Made Active in Reports: 05/18/2010  
Number of Days to Update: 41

Source: Department of Health Services  
Telephone: 707-565-6565  
Last EDR Contact: 04/05/2010  
Next Scheduled EDR Contact: 07/19/2010  
Data Release Frequency: Quarterly

### SUTTER COUNTY:

#### Underground Storage Tanks

Underground storage tank sites located in Sutter county.

Date of Government Version: 04/01/2009  
Date Data Arrived at EDR: 04/02/2009  
Date Made Active in Reports: 04/09/2009  
Number of Days to Update: 7

Source: Sutter County Department of Agriculture  
Telephone: 530-822-7500  
Last EDR Contact: 04/13/2010  
Next Scheduled EDR Contact: 06/28/2010  
Data Release Frequency: Semi-Annually

### VENTURA COUNTY:

#### Business Plan, Hazardous Waste Producers, and Operating Underground Tanks

The BWT list indicates by site address whether the Environmental Health Division has Business Plan (B), Waste Producer (W), and/or Underground Tank (T) information.

Date of Government Version: 01/26/2010  
Date Data Arrived at EDR: 02/25/2010  
Date Made Active in Reports: 03/04/2010  
Number of Days to Update: 7

Source: Ventura County Environmental Health Division  
Telephone: 805-654-2813  
Last EDR Contact: 02/23/2010  
Next Scheduled EDR Contact: 09/06/2010  
Data Release Frequency: Quarterly

#### Inventory of Illegal Abandoned and Inactive Sites

Ventura County Inventory of Closed, Illegal Abandoned, and Inactive Sites.

Date of Government Version: 08/01/2009  
Date Data Arrived at EDR: 10/05/2009  
Date Made Active in Reports: 10/13/2009  
Number of Days to Update: 8

Source: Environmental Health Division  
Telephone: 805-654-2813  
Last EDR Contact: 05/03/2010  
Next Scheduled EDR Contact: 08/16/2010  
Data Release Frequency: Annually

#### Listing of Underground Tank Cleanup Sites

Ventura County Underground Storage Tank Cleanup Sites (LUST).

Date of Government Version: 05/29/2008  
Date Data Arrived at EDR: 06/24/2008  
Date Made Active in Reports: 07/31/2008  
Number of Days to Update: 37

Source: Environmental Health Division  
Telephone: 805-654-2813  
Last EDR Contact: 05/24/2010  
Next Scheduled EDR Contact: 09/06/2010  
Data Release Frequency: Quarterly

#### Underground Tank Closed Sites List

Ventura County Operating Underground Storage Tank Sites (UST)/Underground Tank Closed Sites List.

Date of Government Version: 03/05/2010  
Date Data Arrived at EDR: 03/24/2010  
Date Made Active in Reports: 04/14/2010  
Number of Days to Update: 21

Source: Environmental Health Division  
Telephone: 805-654-2813  
Last EDR Contact: 03/24/2010  
Next Scheduled EDR Contact: 07/05/2010  
Data Release Frequency: Quarterly

### YOLO COUNTY:

## GOVERNMENT RECORDS SEARCHED / DATA CURRENCY TRACKING

### Underground Storage Tank Comprehensive Facility Report Underground storage tank sites located in Yolo county.

Date of Government Version: 04/07/2010	Source: Yolo County Department of Health
Date Data Arrived at EDR: 04/13/2010	Telephone: 530-666-8646
Date Made Active in Reports: 05/18/2010	Last EDR Contact: 03/29/2010
Number of Days to Update: 35	Next Scheduled EDR Contact: 07/12/2010
	Data Release Frequency: Annually

### OTHER DATABASE(S)

Depending on the geographic area covered by this report, the data provided in these specialty databases may or may not be complete. For example, the existence of wetlands information data in a specific report does not mean that all wetlands in the area covered by the report are included. Moreover, the absence of any reported wetlands information does not necessarily mean that wetlands do not exist in the area covered by the report.

#### CT MANIFEST: Hazardous Waste Manifest Data

Facility and manifest data. Manifest is a document that lists and tracks hazardous waste from the generator through transporters to a tsd facility.

Date of Government Version: 12/31/2007	Source: Department of Environmental Protection
Date Data Arrived at EDR: 08/26/2009	Telephone: 860-424-3375
Date Made Active in Reports: 09/11/2009	Last EDR Contact: 03/02/2010
Number of Days to Update: 16	Next Scheduled EDR Contact: 06/07/2010
	Data Release Frequency: Annually

#### NJ MANIFEST: Manifest Information

Hazardous waste manifest information.

Date of Government Version: 12/31/2009	Source: Department of Environmental Protection
Date Data Arrived at EDR: 01/20/2010	Telephone: N/A
Date Made Active in Reports: 02/05/2010	Last EDR Contact: 04/23/2010
Number of Days to Update: 16	Next Scheduled EDR Contact: 08/02/2010
	Data Release Frequency: Annually

#### NY MANIFEST: Facility and Manifest Data

Manifest is a document that lists and tracks hazardous waste from the generator through transporters to a TSD facility.

Date of Government Version: 01/04/2010	Source: Department of Environmental Conservation
Date Data Arrived at EDR: 02/11/2010	Telephone: 518-402-8651
Date Made Active in Reports: 03/17/2010	Last EDR Contact: 05/13/2010
Number of Days to Update: 34	Next Scheduled EDR Contact: 08/23/2010
	Data Release Frequency: Annually

#### PA MANIFEST: Manifest Information

Hazardous waste manifest information.

Date of Government Version: 12/31/2008	Source: Department of Environmental Protection
Date Data Arrived at EDR: 12/01/2009	Telephone: N/A
Date Made Active in Reports: 12/14/2009	Last EDR Contact: 05/24/2010
Number of Days to Update: 13	Next Scheduled EDR Contact: 09/06/2010
	Data Release Frequency: Annually

#### RI MANIFEST: Manifest information

Hazardous waste manifest information

Date of Government Version: 11/03/2009	Source: Department of Environmental Management
Date Data Arrived at EDR: 02/12/2010	Telephone: 401-222-2797
Date Made Active in Reports: 02/22/2010	Last EDR Contact: 03/01/2010
Number of Days to Update: 10	Next Scheduled EDR Contact: 06/14/2010
	Data Release Frequency: Annually



## GOVERNMENT RECORDS SEARCHED / DATA CURRENCY TRACKING

### WI MANIFEST: Manifest Information

Hazardous waste manifest information.

Date of Government Version: 12/31/2008

Date Data Arrived at EDR: 07/17/2009

Date Made Active in Reports: 08/10/2009

Number of Days to Update: 24

Source: Department of Natural Resources

Telephone: N/A

Last EDR Contact: 03/22/2010

Next Scheduled EDR Contact: 07/05/2010

Data Release Frequency: Annually

**Oil/Gas Pipelines:** This data was obtained by EDR from the USGS in 1994. It is referred to by USGS as GeoData Digital Line Graphs from 1:100,000-Scale Maps. It was extracted from the transportation category including some oil, but primarily gas pipelines.

### Electric Power Transmission Line Data

Source: PennWell Corporation

Telephone: (800) 823-6277

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**Sensitive Receptors.** There are individuals deemed sensitive receptors due to their fragile immune systems and special sensitivity to environmental discharges. These sensitive receptors typically include the elderly, the sick, and children. While the location of all sensitive receptors cannot be determined, EDR indicates those buildings and facilities - schools, daycares, hospitals, medical centers, and nursing homes - where individuals who are sensitive receptors are likely to be located.

### AHA Hospitals:

Source: American Hospital Association, Inc.

Telephone: 312-280-5991

The database includes a listing of hospitals based on the American Hospital Association's annual survey of hospitals.

### Medical Centers: Provider of Services Listing

Source: Centers for Medicare & Medicaid Services

Telephone: 410-786-3000

A listing of hospitals with Medicare provider number, produced by Centers of Medicare & Medicaid Services, a federal agency within the U.S. Department of Health and Human Services.

### Nursing Homes

Source: National Institutes of Health

Telephone: 301-594-6248

Information on Medicare and Medicaid certified nursing homes in the United States.

### Public Schools

Source: National Center for Education Statistics

Telephone: 202-502-7300

The National Center for Education Statistics' primary database on elementary and secondary public education in the United States. It is a comprehensive, annual, national statistical database of all public elementary and secondary schools and school districts, which contains data that are comparable across all states.

### Private Schools

Source: National Center for Education Statistics

Telephone: 202-502-7300

The National Center for Education Statistics' primary database on private school locations in the United States.

### Daycare Centers: Licensed Facilities

Source: Department of Social Services

Telephone: 916-657-4041

**Flood Zone Data:** This data, available in select counties across the country, was obtained by EDR in 2003 & 2009 from the Federal Emergency Management Agency (FEMA). Data depicts 100-year and 500-year flood zones as defined by FEMA.

**NWI:** National Wetlands Inventory. This data, available in select counties across the country, was obtained by EDR in 2002 and 2005 from the U.S. Fish and Wildlife Service.

## GOVERNMENT RECORDS SEARCHED / DATA CURRENCY TRACKING

Scanned Digital USGS 7.5' Topographic Map (DRG)

Source: United States Geologic Survey

A digital raster graphic (DRG) is a scanned image of a U.S. Geological Survey topographic map. The map images are made by scanning published paper maps on high-resolution scanners. The raster image is georeferenced and fit to the Universal Transverse Mercator (UTM) projection.

### STREET AND ADDRESS INFORMATION

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## **GEOCHECK® - PHYSICAL SETTING SOURCE ADDENDUM**

### **TARGET PROPERTY ADDRESS**

YERBA BUENA ISLAND OFFRAMPS  
GATE ROAD/4TH STREET  
SAN FRANCISCO, CA 94130

### **TARGET PROPERTY COORDINATES**

Latitude (North):	37.81210 - 37° 48' 43.6"
Longitude (West):	122.3625 - 122° 21' 45.0"
Universal Tranverse Mercator:	Zone 10
UTM X (Meters):	556115.0
UTM Y (Meters):	4184953.8
Elevation:	34 ft. above sea level

### **USGS TOPOGRAPHIC MAP**

Target Property Map:	37122-G3 OAKLAND WEST, CA
Most Recent Revision:	1980
West Map:	37122-G4 SAN FRANCISCO NORTH, CA
Most Recent Revision:	1999

EDR's GeoCheck Physical Setting Source Addendum is provided to assist the environmental professional in forming an opinion about the impact of potential contaminant migration.

Assessment of the impact of contaminant migration generally has two principle investigative components:

1. Groundwater flow direction, and
2. Groundwater flow velocity.

Groundwater flow direction may be impacted by surface topography, hydrology, hydrogeology, characteristics of the soil, and nearby wells. Groundwater flow velocity is generally impacted by the nature of the geologic strata.

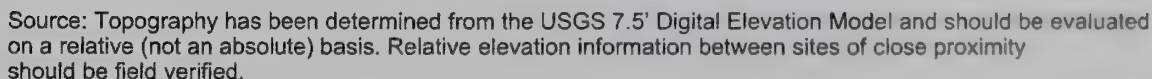


## GROUNDWATER FLOW DIRECTION INFORMATION

### TOPOGRAPHIC INFORMATION

## TARGET PROPERTY TOPOGRAPHY

### SURROUNDING TOPOGRAPHY: ELEVATION PROFILES



## GEOCHECK® - PHYSICAL SETTING SOURCE SUMMARY

### HYDROLOGIC INFORMATION

Surface water can act as a hydrologic barrier to groundwater flow. Such hydrologic information can be used to assist the environmental professional in forming an opinion about the impact of nearby contaminated properties or, should contamination exist on the target property, what downgradient sites might be impacted.

Refer to the Physical Setting Source Map following this summary for hydrologic information (major waterways and bodies of water).

### FEMA FLOOD ZONE

Target Property County  
SAN FRANCISCO, CA

FEMA Flood  
Electronic Data  
Not Available

Flood Plain Panel at Target Property:

Not Reported

Additional Panels in search area:

06001C - FEMA DFIRM Flood data

### NATIONAL WETLAND INVENTORY

NWI Quad at Target Property  
OAKLAND WEST

NWI Electronic  
Data Coverage  
YES - refer to the Overview Map and Detail Map

### HYDROGEOLOGIC INFORMATION

Hydrogeologic information obtained by installation of wells on a specific site can often be an indicator of groundwater flow direction in the immediate area. Such hydrogeologic information can be used to assist the environmental professional in forming an opinion about the impact of nearby contaminated properties or, should contamination exist on the target property, what downgradient sites might be impacted.

#### **Site-Specific Hydrogeological Data\*:**

Search Radius:	1.25 miles
Location Relative to TP:	1/2 - 1 Mile NW
Site Name:	Treasure Isl Naval Station
Site EPA ID Number:	CA7170023330
Groundwater Flow Direction:	INTO SAN FRANCISCO BAY.
Measured Depth to Water:	3 feet to 6 feet.
Hydraulic Connection:	Information is not available about the hydraulic connection between aquifer(s) underlying the site.
Sole Source Aquifer:	No information about a sole source aquifer is available
Data Quality:	Information based on site-specific subsurface investigations is documented in the CERCLIS investigation report(s)

### AQUIFLOW®

Search Radius: 1.000 Mile.

EDR has developed the AQUIFLOW Information System to provide data on the general direction of groundwater flow at specific points. EDR has reviewed reports submitted by environmental professionals to regulatory authorities at select sites and has extracted the date of the report, groundwater flow direction as determined hydrogeologically, and the depth to water table.

<u>MAP ID</u>	<u>LOCATION FROM TP</u>	<u>GENERAL DIRECTION GROUNDWATER FLOW</u>
Not Reported		

\* ©1996 Site-specific hydrogeological data gathered by CERCLIS Alerts, Inc. Bainbridge Island, WA. All rights reserved. All of the information and opinions presented are those of the cited EPA report(s), which were completed under a Comprehensive Environmental Response Compensation and Liability Information System (CERCLIS) investigation

## **GEOCHECK® - PHYSICAL SETTING SOURCE SUMMARY**

### **GROUNDWATER FLOW VELOCITY INFORMATION**

Groundwater flow velocity information for a particular site is best determined by a qualified environmental professional using site specific geologic and soil strata data. If such data are not reasonably ascertainable, it may be necessary to rely on other sources of information, including geologic age identification, rock stratigraphic unit and soil characteristics data collected on nearby properties and regional soil information. In general, contaminant plumes move more quickly through sandy-gravelly types of soils than silty-clayey types of soils.

### **GEOLOGIC INFORMATION IN GENERAL AREA OF TARGET PROPERTY**

Geologic information can be used by the environmental professional in forming an opinion about the relative speed at which contaminant migration may be occurring.

#### **ROCK STRATIGRAPHIC UNIT**

Era: Mesozoic  
System: Cretaceous  
Series: Upper Mesozoic  
Code: uMZe(decoded above as Era, System & Series)

#### **GEOLOGIC AGE IDENTIFICATION**

Category: Eugeosynclinal Deposits

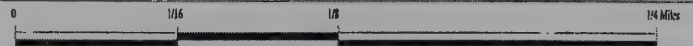
Geologic Age and Rock Stratigraphic Unit Source: P.G. Schruben, R.E. Arndt and W.J. Bawiec, Geology of the Conterminous U.S. at 1:2,500,000 Scale - a digital representation of the 1974 P.B. King and H.M. Beikman Map, USGS Digital Data Series DDS - 11 (1994).



# SSURGO SOIL MAP - 2781761.2s



★ Target Property  
 SSURGO Soil  
 Water



17

SITE NAME: Yerba Buena Island Offramps  
 ADDRESS: Gate Road/4th Street  
 San Francisco CA 94130  
 LAT/LONG: 37.8121 / 122.3625

CLIENT: AECOM  
 CONTACT: Robert Olsen  
 INQUIRY #: 2781761.2s  
 DATE: June 01, 2010 12:54 pm

## GEOCHECK® - PHYSICAL SETTING SOURCE SUMMARY

### DOMINANT SOIL COMPOSITION IN GENERAL AREA OF TARGET PROPERTY

The U.S. Department of Agriculture's (USDA) Soil Conservation Service (SCS) leads the National Cooperative Soil Survey (NCSS) and is responsible for collecting, storing, maintaining and distributing soil survey information for privately owned lands in the United States. A soil map in a soil survey is a representation of soil patterns in a landscape. The following information is based on Soil Conservation Service SSURGO data.

#### Soil Map ID: 1

Soil Component Name: Urban land

Soil Surface Texture:  
Hydrologic Group: Class D - Very slow infiltration rates. Soils are clayey, have a high water table, or are shallow to an impervious layer.

Soil Drainage Class:  
Hydric Status: Not hydric

Corrosion Potential - Uncoated Steel: Not Reported

Depth to Bedrock Min: > 0 inches

Depth to Watertable Min: > 0 inches

Soil Layer Information							
Layer	Boundary		Soil Texture Class	Classification		Saturated hydraulic conductivity micro m/sec	Soil Reaction (pH)
	Upper	Lower		AASHTO Group	Unified Soil		
1	0 inches	5 inches		Not reported	Not reported	Max: 0.01 Min: 0	Max: Min:

#### Soil Map ID: 2

Soil Component Name: Orthents

Soil Surface Texture:  
Hydrologic Group: Class D - Very slow infiltration rates. Soils are clayey, have a high water table, or are shallow to an impervious layer.

Soil Drainage Class: Well drained

Hydric Status: Not hydric

Corrosion Potential - Uncoated Steel: Not Reported

Depth to Bedrock Min: > 0 inches

Depth to Watertable Min: > 0 inches

## GEOCHECK® - PHYSICAL SETTING SOURCE SUMMARY

Soil Layer Information							
	Boundary			Classification		Saturated hydraulic conductivity micro m/sec	Soil Reaction (pH)
Layer	Upper	Lower	Soil Texture Class	AASHTO Group	Unified Soil		
1	0 inches	59 inches		Not reported	Not reported	Max: Min:	Max: Min:

### Soil Map ID: 3

Soil Component Name: Candlestick

Soil Surface Texture: fine sandy loam

Hydrologic Group: Class C - Slow infiltration rates. Soils with layers impeding downward movement of water, or soils with moderately fine or fine textures.

Soil Drainage Class: Well drained

Hydric Status: Not hydric

Corrosion Potential - Uncoated Steel: Moderate

Depth to Bedrock Min: > 36 inches

Depth to Watertable Min: > 0 inches

Soil Layer Information							
	Boundary			Classification		Saturated hydraulic conductivity micro m/sec	Soil Reaction (pH)
Layer	Upper	Lower	Soil Texture Class	AASHTO Group	Unified Soil		
1	0 inches	1 inches	fine sandy loam	Not reported	Not reported	Max: Min:	Max: Min:
2	1 inches	20 inches	loam	Not reported	Not reported	Max: Min:	Max: Min:
3	20 inches	24 inches	sandy clay loam	Not reported	Not reported	Max: Min:	Max: Min:
4	24 inches	27 inches		Not reported	Not reported	Max: Min:	Max: Min:

### Soil Map ID: 4

Soil Component Name: Water

Soil Surface Texture: fine sandy loam

Hydrologic Group: Class C - Slow infiltration rates. Soils with layers impeding downward movement of water, or soils with moderately fine or fine textures.

Soil Drainage Class:



## GEOCHECK® - PHYSICAL SETTING SOURCE SUMMARY

Hydric Status: Not hydric

Corrosion Potential - Uncoated Steel: Not Reported

Depth to Bedrock Min: > 0 inches

Depth to Watertable Min: > 0 inches

No Layer Information available.

### Soil Map ID: 5

Soil Component Name: Urban land

Soil Surface Texture:

Hydrologic Group:

Class D - Very slow infiltration rates. Soils are clayey, have a high water table, or are shallow to an impervious layer.

Soil Drainage Class:

Hydric Status: Partially hydric

Corrosion Potential - Uncoated Steel: Not Reported

Depth to Bedrock Min: > 0 inches

Depth to Watertable Min: > 0 inches

Soil Layer Information							
Layer	Boundary		Soil Texture Class	Classification		Saturated hydraulic conductivity micro m/sec	Soil Reaction (pH)
	Upper	Lower		AASHTO Group	Unified Soil		
1	0 inches	5 inches		Not reported	Not reported	Max: 0.01 Min: 0	Max: Min:

### LOCAL / REGIONAL WATER AGENCY RECORDS

EDR Local/Regional Water Agency records provide water well information to assist the environmental professional in assessing sources that may impact ground water flow direction, and in forming an opinion about the impact of contaminant migration on nearby drinking water wells.

### WELL SEARCH DISTANCE INFORMATION

<u>DATABASE</u>	<u>SEARCH DISTANCE (miles)</u>
Federal USGS	1.000
Federal FRDS PWS	Nearest PWS within 1 mile
State Database	1.000

## GEOCHECK® - PHYSICAL SETTING SOURCE SUMMARY

### FEDERAL USGS WELL INFORMATION

MAP ID	WELL ID	LOCATION FROM TP
No Wells Found		

### FEDERAL FRDS PUBLIC WATER SUPPLY SYSTEM INFORMATION

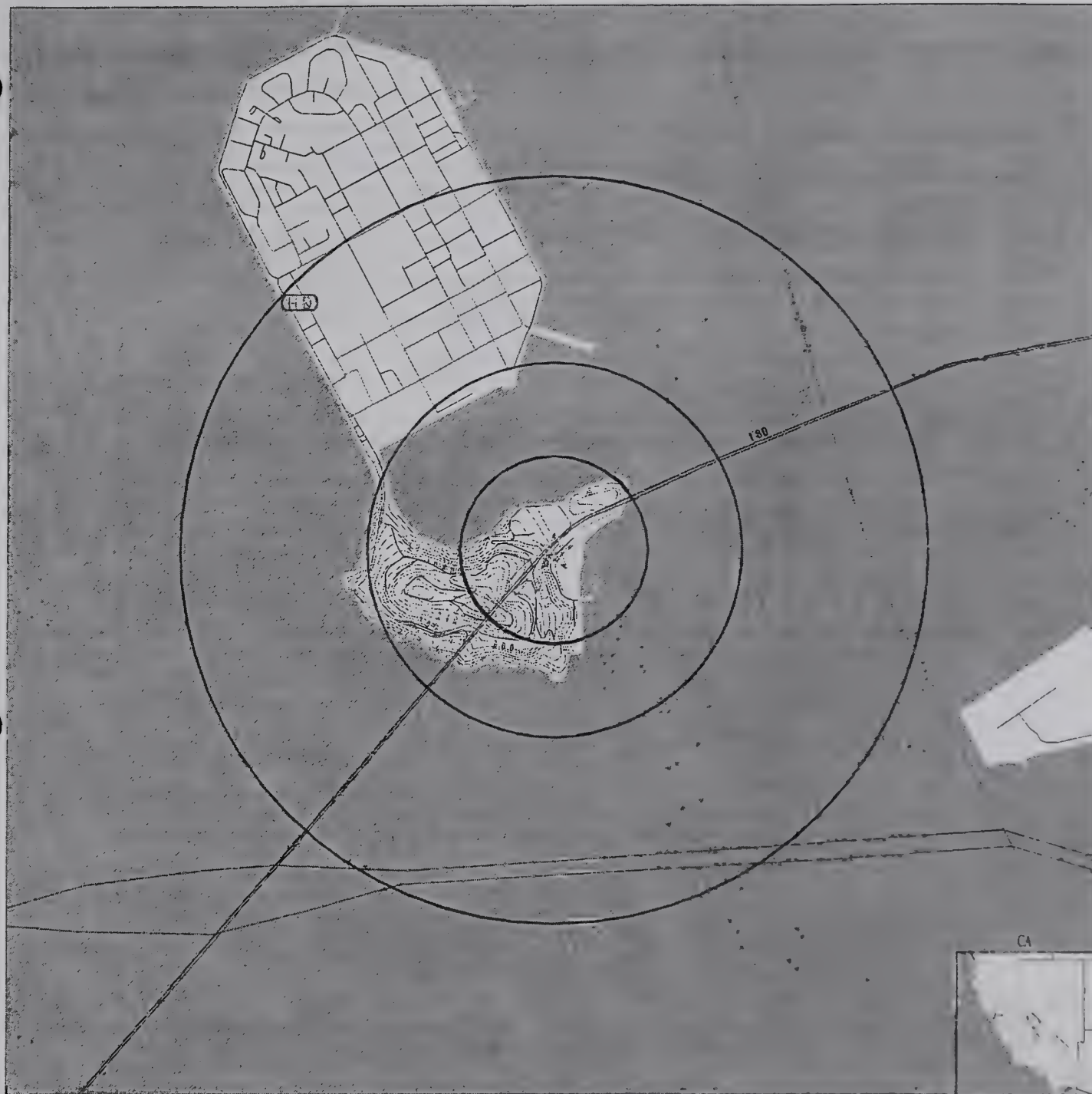
MAP ID	WELL ID	LOCATION FROM TP
No PWS System Found		

Note: PWS System location is not always the same as well location.

### STATE DATABASE WELL INFORMATION

MAP ID	WELL ID	LOCATION FROM TP
No Wells Found		

# PHYSICAL SETTING SOURCE MAP - 2781761.2s



County Boundary

Major Roads

Contour Lines

Earthquake Fault Lines

Earthquake epicenter, Richter 5 or greater

Water Wells

Public Water Supply Wells

Cluster of Multiple Icons

Groundwater Flow Direction

(GI) Indeterminate Groundwater Flow at Location

(GV) Groundwater Flow Varies at Location

(HD) Closest Hydrogeological Data

Oil, gas or related wells

SITE NAME: Yerba Buena Island Offramps  
 ADDRESS: Gate Road/4th Street  
 San Francisco CA 94130  
 LAT/LONG: 37.8121 / 122.3625

CLIENT: AECOM  
 CONTACT: Robert Olsen  
 INQUIRY #: 2781761.2s  
 DATE: June 01, 2010 12:54 pm



## GEOCHECK® - PHYSICAL SETTING SOURCE MAP FINDINGS RADON

### AREA RADON INFORMATION

Federal EPA Radon Zone for SAN FRANCISCO County: 2

Note: Zone 1 indoor average level > 4 pCi/L.

: Zone 2 indoor average level >= 2 pCi/L and <= 4 pCi/L.

: Zone 3 indoor average level < 2 pCi/L.

---

Federal Area Radon Information for SAN FRANCISCO COUNTY, CA

Number of sites tested: 14

Area	Average Activity	% <4 pCi/L	% 4-20 pCi/L	% >20 pCi/L
Living Area - 1st Floor	0.636 pCi/L	100%	0%	0%
Living Area - 2nd Floor	0.500 pCi/L	100%	0%	0%
Basement	0.360 pCi/L	100%	0%	0%

# PHYSICAL SETTING SOURCE RECORDS SEARCHED

## TOPOGRAPHIC INFORMATION

### USGS 7.5' Digital Elevation Model (DEM)

Source: United States Geologic Survey

EDR acquired the USGS 7.5' Digital Elevation Model in 2002 and updated it in 2006. The 7.5 minute DEM corresponds to the USGS 1:24,000- and 1:25,000-scale topographic quadrangle maps. The DEM provides elevation data with consistent elevation units and projection.

### Scanned Digital USGS 7.5' Topographic Map (DRG)

Source: United States Geologic Survey

A digital raster graphic (DRG) is a scanned image of a U.S. Geological Survey topographic map. The map images are made by scanning published paper maps on high-resolution scanners. The raster image is georeferenced and fit to the Universal Transverse Mercator (UTM) projection.

## HYDROLOGIC INFORMATION

Flood Zone Data: This data, available in select counties across the country, was obtained by EDR in 2003 & 2009 from the Federal Emergency Management Agency (FEMA). Data depicts 100-year and 500-year flood zones as defined by FEMA.

NWI: National Wetlands Inventory. This data, available in select counties across the country, was obtained by EDR in 2002 and 2005 from the U.S. Fish and Wildlife Service.

## HYDROGEOLOGIC INFORMATION

### AQUIFLOW<sup>R</sup> Information System

Source: EDR proprietary database of groundwater flow information

EDR has developed the AQUIFLOW Information System (AIS) to provide data on the general direction of groundwater flow at specific points. EDR has reviewed reports submitted to regulatory authorities at select sites and has extracted the date of the report, hydrogeologically determined groundwater flow direction and depth to water table information.

## GEOLOGIC INFORMATION

### Geologic Age and Rock Stratigraphic Unit

Source: P.G. Schruben, R.E. Arndt and W.J. Bawiec, Geology of the Conterminous U.S. at 1:2,500,000 Scale - A digital representation of the 1974 P.B. King and H.M. Beikman Map, USGS Digital Data Series DDS - 11 (1994).

### STATSGO: State Soil Geographic Database

Source: Department of Agriculture, Natural Resources Conservation Services

The U.S. Department of Agriculture's (USDA) Natural Resources Conservation Service (NRCS) leads the national Conservation Soil Survey (NCSS) and is responsible for collecting, storing, maintaining and distributing soil survey information for privately owned lands in the United States. A soil map in a soil survey is a representation of soil patterns in a landscape. Soil maps for STATSGO are compiled by generalizing more detailed (SSURGO) soil survey maps.

### SSURGO: Soil Survey Geographic Database

Source: Department of Agriculture, Natural Resources Conservation Services (NRCS)

Telephone: 800-672-5559

SSURGO is the most detailed level of mapping done by the Natural Resources Conservation Services, mapping scales generally range from 1:12,000 to 1:63,360. Field mapping methods using national standards are used to construct the soil maps in the Soil Survey Geographic (SSURGO) database. SSURGO digitizing duplicates the original soil survey maps. This level of mapping is designed for use by landowners, townships and county natural resource planning and management.

# PHYSICAL SETTING SOURCE RECORDS SEARCHED

## LOCAL / REGIONAL WATER AGENCY RECORDS

### FEDERAL WATER WELLS

#### PWS: Public Water Systems

Source: EPA/Office of Drinking Water

Telephone: 202-564-3750

Public Water System data from the Federal Reporting Data System. A PWS is any water system which provides water to at least 25 people for at least 60 days annually. PWSs provide water from wells, rivers and other sources.

#### PWS ENF: Public Water Systems Violation and Enforcement Data

Source: EPA/Office of Drinking Water

Telephone: 202-564-3750

Violation and Enforcement data for Public Water Systems from the Safe Drinking Water Information System (SDWIS) after August 1995. Prior to August 1995, the data came from the Federal Reporting Data System (FRDS).

#### USGS Water Wells: USGS National Water Inventory System (NWIS)

This database contains descriptive information on sites where the USGS collects or has collected data on surface water and/or groundwater. The groundwater data includes information on wells, springs, and other sources of groundwater.

### STATE RECORDS

#### Water Well Database

Source: Department of Water Resources

Telephone: 916-651-9648

#### California Drinking Water Quality Database

Source: Department of Health Services

Telephone: 916-324-2319

The database includes all drinking water compliance and special studies monitoring for the state of California since 1984. It consists of over 3,200,000 individual analyses along with well and water system information.

## OTHER STATE DATABASE INFORMATION

#### California Oil and Gas Well Locations

Source: Department of Conservation

Telephone: 916-323-1779

Oil and Gas well locations in the state.

### RADON

#### State Database: CA Radon

Source: Department of Health Services

Telephone: 916-324-2208

Radon Database for California

#### Area Radon Information

Source: USGS

Telephone: 703-356-4020

The National Radon Database has been developed by the U.S. Environmental Protection Agency (USEPA) and is a compilation of the EPA/State Residential Radon Survey and the National Residential Radon Survey. The study covers the years 1986 - 1992. Where necessary data has been supplemented by information collected at private sources such as universities and research institutions.

#### EPA Radon Zones

Source: EPA

Telephone: 703-356-4020

Sections 307 & 309 of IRAA directed EPA to list and identify areas of U.S. with the potential for elevated indoor radon levels.



## PHYSICAL SETTING SOURCE RECORDS SEARCHED

### OTHER

Airport Landing Facilities: Private and public use landing facilities  
Source: Federal Aviation Administration, 800-457-6656

Epicenters: World earthquake epicenters, Richter 5 or greater  
Source: Department of Commerce, National Oceanic and Atmospheric Administration

California Earthquake Fault Lines: The fault lines displayed on EDR's Topographic map are digitized quaternary fault lines, prepared in 1975 by the United State Geological Survey. Additional information (also from 1975) regarding activity at specific fault lines comes from California's Preliminary Fault Activity Map prepared by the California Division of Mines and Geology.

### STREET AND ADDRESS INFORMATION

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**YERBA BUENA ISLAND STATION FLOAT**  
**YERBA BUENA ISLAND STATION FLOATING DOCKS**  
**SAN FRANCISCO, CA 94130**

**Inquiry Number:**  
**June 4, 2010**

**EDR Site Report™**



# TABLE OF CONTENTS

The EDR-Site Report™ is a comprehensive presentation of government filings on a facility identified in a search of federal, state and local environmental databases. The report is divided into three sections:

**Section 1: Facility Summary ..... Page 3**

Summary of facility filings including a review of the following areas: waste management, waste disposal, multi-media issues, and Superfund liability.

**Section 2: Facility Detail Reports ..... Page 4**

All available detailed information from databases where sites are identified.

**Section 3: Databases and Update Information..... Page 5**

Name, source, update dates, contact phone number and description of each of the databases for this report.

***Thank you for your business.***  
Please contact EDR at 1-800-352-0050  
with any questions or comments.

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## SECTION 1: FACILITY SUMMARY

FACILITY	FACILITY 1
<b>AREA</b>	<b>YERBA BUENA ISLAND STATION FLOATING DOCKS</b> YERBA BUENA ISLAND STATION FLOATING DOCKS SAN FRANCISCO, CA 94130 EDR ID #96492266
<b>WASTE MANAGEMENT</b>	
Facility generates hazardous waste (RCRA)	NO
Facility treats, stores, or disposes of hazardous waste on-site (RCRA/TSDF)	NO
Facility has received Notices of Violations (RCRA/VIOL)	NO
Facility has been subject to RCRA administrative actions (RAATS)	NO
Facility has been subject to corrective actions (CORRACTS)	NO
Facility handles PCBs (PADS)	NO
Facility uses radioactive materials (MLTS)	NO
Facility manages registered aboveground storage tanks (AST)	NO
Facility manages registered underground storage tanks (UST)	NO
Facility has reported leaking underground storage tank incidents (LUST)	NO
Facility has reported emergency releases to the soil (ERNS)	YES - p4
Facility has reported hazardous material incidents to DOT (HMIRS)	NO
<b>WASTE DISPOSAL</b>	
Facility is a Superfund Site (NPL)	NO
Facility has a known or suspect abandoned, inactive or uncontrolled hazardous waste site (CERCLIS)	NO
Facility has a reported Superfund Lien on it (LIENS)	NO
Facility is listed as a state hazardous waste site (SHWS)	NO
Facility has disposed of solid waste on-site (SWF/LF)	NO
<b>MULTIMEDIA</b>	
Facility uses toxic chemicals and has notified EPA under SARA Title III, Section 313 (TRIS)	NO
Facility produces pesticides and has notified EPA under Section 7 of FIFRA (SSTS)	NO
Facility manufactures or imports toxic chemicals on the TSCA list (TSCA)	NO
Facility has inspections under FIFRA, TSCA or EPCRA (FTTS)	NO
Facility is listed in EPA's Index system (FINDS)	NO
Facility is listed in a county/local unique database (LOCAL)	NO
<b>POTENTIAL SUPERFUND LIABILITY</b>	
Facility has a list of potentially responsible parties PRP	NO
<b>TOTAL (YES)</b>	1

## SECTION 2: FACILITY DETAIL REPORTS

### WASTE MANAGEMENT

Facility has reported emergency releases to the soil

**DATABASE: Emergency Response Notification System (ERNS)**

YERBA BUENA ISLAND STATION FLOATING DOCKS  
YERBA BUENA ISLAND STATION FLOATING DOCKS  
SAN FRANCISCO, CA 94130  
EDR ID #96492266

#### ERNS:

Site ID:	96492266
Source:	Not reported
Site location:	YERBA BUENA ISLAND STATION FLOATING DOCKS SAN FRANCISCO, CA 94130
County:	SAN FRANCISCO
Report number:	343239
Report date:	05/22/1996
Report time:	13:29
Spill date:	05/22/1996
Spill time:	10:00
Spiller:	True
Confidential:	False
Medium affected:	Water
Dist. from city:	Not reported
Heading:	Not reported
Field ID:	Not reported
Block ID:	Not reported
Vehicle ID:	Not reported
Mile post:	Not reported
Transport mode:	FIXED
Damage:	False
Damage \$ amount:	0.
Evacuation:	False
Number of injured:	Not reported
Number of fatalities:	Not reported
Notes:	SAN FRANCISCO BAY
Agency notified:	USCG
Notified by caller:	NONE
Other agency:	Not reported
EPA time:	:
Other time:	:
C.G. unit:	SFCMS
C.G. time:	13:37
Duty officer:	AMG
Jurisdiction:	Not reported
Reportable:	Not reported
Cause:	Not reported
Tank capacity:	Not reported
Facility capacity:	Not reported
Cont rel. type:	Not reported
Comments:	THE MATERIAL HAS BEEN CONTAINED AND IS BEING CLEANED UP / WILL REPAIR THE LINE
Comments:	2 INCH OILY-WATER SEPARATOR LINE / THE LINE LEAKED DUE TO UNKNOWN CAUSES
Comments:	(PROBABLY DUE TO CONSTRUCTION)
Comments:	YERBA BUENA ISLAND STATION FLOATING DOCKS
Comments:	SHEEN SIZE: 5FT X 2FT, BLACK IN COLOR / CALLER HAD NO OTHER INFORMATION



### SECTION 3: DATABASES AND UPDATE DATES

To maintain currency of the following federal, state and local databases, EDR contacts the appropriate government agency on a monthly or quarterly basis as required.

**Elapsed ASTM days:** Provides confirmation that this report meets or exceeds the 90-day updating requirement of the ASTM standard.

#### DATABASES FOUND IN THIS REPORT

**ERNS: Emergency Response Notification System**

Source: National Response Center, United States Coast Guard

Telephone: 202-267-2180

Emergency Response Notification System. ERNS records and stores information on reported releases of oil and hazardous substances.

Date of Government Version: 12/31/2009  
Database Release Frequency: Annually

Date of Last EDR Contact: 04/07/2010  
Date of Next Scheduled Update: 07/19/2010



**YERBA BUENA ISLAND GROUP SAN FRA**  
**YERBA BUENA ISLAND GROUP SAN FRANCISCO**  
**SAN FRANCISCO, CA**

**Inquiry Number:**  
**June 4, 2010**

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All available detailed information from databases where sites are identified.

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Name, source, update dates, contact phone number and description of each of the databases for this report.

***Thank you for your business.***  
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with any questions or comments.

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## SECTION 1: FACILITY SUMMARY

FACILITY  AREA	FACILITY 1 YERBA BUENA ISLAND GROUP SAN FRANCISCO YERBA BUENA ISLAND GROUP SAN FRANCISCO SAN FRANCISCO, CA EDR ID #96508190
<b>WASTE MANAGEMENT</b> Facility generates hazardous waste (RCRA)	NO
Facility treats, stores, or disposes of hazardous waste on-site (RCRA/TSD)	NO
Facility has received Notices of Violations (RCRA/VIOL)	NO
Facility has been subject to RCRA administrative actions (RAATS)	NO
Facility has been subject to corrective actions (CORRACTS)	NO
Facility handles PCBs (PADS)	NO
Facility uses radioactive materials (MLTS)	NO
Facility manages registered aboveground storage tanks (AST)	NO
Facility manages registered underground storage tanks (UST)	NO
Facility has reported leaking underground storage tank incidents (LUST)	NO
Facility has reported emergency releases to the soil (ERNS)	YES - p4
Facility has reported hazardous material incidents to DOT (HMIRS)	NO
<b>WASTE DISPOSAL</b> Facility is a Superfund Site (NPL)	NO
Facility has a known or suspect abandoned, inactive or uncontrolled hazardous waste site (CERCLIS)	NO
Facility has a reported Superfund Lien on it (LIENS)	NO
Facility is listed as a state hazardous waste site (SHWS)	NO
Facility has disposed of solid waste on-site (SWF/LF)	NO
<b>MULTIMEDIA</b> Facility uses toxic chemicals and has notified EPA under SARA Title III, Section 313 (TRIS)	NO
Facility produces pesticides and has notified EPA under Section 7 of FIFRA (SSTS)	NO
Facility manufactures or imports toxic chemicals on the TSCA list (TSCA)	NO
Facility has inspections under FIFRA, TSCA or EPCRA (FTTS)	NO
Facility is listed in EPA's index system (FINDS)	NO
Facility is listed in a county/local unique database (LOCAL)	NO
<b>POTENTIAL SUPERFUND LIABILITY</b> Facility has a list of potentially responsible parties PRP	NO
<b>TOTAL (YES)</b>	1

## SECTION 2: FACILITY DETAIL REPORTS

### WASTE MANAGEMENT

Facility has reported emergency releases to the soil

DATABASE: Emergency Response Notification System (ERNS)

YERBA BUENA ISLAND GROUP SAN FRANCISCO  
YERBA BUENA ISLAND GROUP SAN FRANCISCO  
SAN FRANCISCO, CA  
EDR ID #96508190

#### ERNS:

Site ID:	96508190
Source:	Not reported
Site location:	YERBA BUENA ISLAND GROUP SAN FRANCISCO SAN FRANCISCO, CA SAN FRANCISCO
County:	SAN FRANCISCO
Report number:	361642
Report date:	09/19/1996
Report time:	11:42
Spill date:	09/19/1996
Spill time:	:30
Spiller:	True
Confidential:	False
Medium affected:	Water
Dist. from city:	Not reported
Heading:	Not reported
Field ID:	Not reported
Block ID:	Not reported
Vehicle ID:	Not reported
Mile post:	Not reported
Transport mode:	MARINE
Damage:	False
Damage \$ amount:	0.
Evacuation:	False
Number of injured:	Not reported
Number of fatalities:	Not reported
Notes:	SAN FRANCISCO BAY
Agency notified:	Not reported
Notified by caller:	NONE
Other agency:	Not reported
EPA time:	:
Other time:	:
C.G. unit:	SFCMS
C.G. time:	12:06
Duty officer:	SMM
Jurisdiction:	Not reported
Reportable:	Not reported
Cause:	Not reported
Tank capacity:	Not reported
Facility capacity:	Not reported
Cont rel. type:	Not reported
Comments:	SECURED / SHEEN DISSIPATED / ABSORBENTS BEING USED ON DECK
Comments:	USCGC BUTTWOOD / 2IN FUEL HOSE RELEASE RESIDUE DURING DISCONNECT AFTER FUELING OPERATIONS
Comments:	YERBA BUENA ISLAND GROUP SAN FRANCISCO
Comments:	WILL NOTIFY: MSO SAN FRANCISCO
Site ID:	96508190
Source:	Not reported
Site location:	YERBA BUENA ISLAND GROUP SAN FRANCISCO SAN FRANCISCO, CA SAN FRANCISCO
County:	SAN FRANCISCO
Report number:	361642
Report date:	09/19/1996
Report time:	11:42
Spill date:	09/19/1996
Spill time:	:30
Spiller:	True
Confidential:	False
Medium affected:	Water
Dist. from city:	Not reported
Heading:	Not reported
Field ID:	Not reported
Block ID:	Not reported
Vehicle ID:	Not reported
Mile post:	Not reported
Transport mode:	MARINE
Damage:	False
Damage \$ amount:	0.
Evacuation:	False



## SECTION 2: FACILITY DETAIL REPORTS

...Continued...

Number of injured:	Not reported
Number of fatalities:	Not reported
Notes:	SAN FRANCISCO BAY
Agency notified:	Not reported
Notified by caller:	NONE
Other agency:	Not reported
EPA time:	:
Other time:	:
C.G. unit:	SFCMS
C.G. time:	12:06
Duty officer:	SMM
Jurisdiction:	Not reported
Reportable:	Not reported
Cause:	Not reported
Tank capacity:	Not reported
Facility capacity:	Not reported
Cont rel. type:	Not reported
Comments:	SECURED / SHEEN DISSIPATED / ABSORBENTS BEING USED ON DECK
Comments:	USCGC BUTTONWOOD / 2IN FUEL HOSE RELEASE RESIDUE DURING DISCONNECT AFTER FUELING OPERATIONS
Comments:	YERBA BUENA ISLAND GROUP SAN FRANCISCO
Comments:	WILL NOTIFY: MSO SAN FRANCISCO

## **APPENDIX D**

# ***HISTORICAL RESEARCH DOCUMENTATION***

## Historical Aerial Photographs





**Yerba Buena Island Offramps**

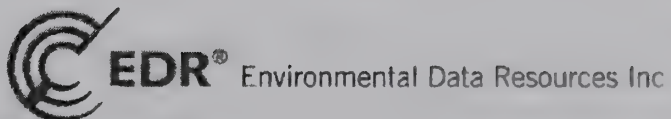
Gate Road/4th Street

San Francisco, CA 94130

Inquiry Number: 2781761.5

June 03, 2010

**The EDR Aerial Photo Decade Package**



440 Wheelers Farms Road  
Milford, CT 06461  
800.352.0050  
[www.edrnet.com](http://www.edrnet.com)

## EDR Aerial Photo Decade Package

Environmental Data Resources, Inc. (EDR) Aerial Photo Decade Package is a screening tool designed to assist environmental professionals in evaluating potential liability on a target property resulting from past activities. EDR's professional researchers provide digitally reproduced historical aerial photographs, and when available, provide one photo per decade.

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**Date EDR Searched Historical Sources:**

Aerial Photography June 03, 2010

**Target Property:**

Gate Road/4th Street

San Francisco, CA 94130

<u>Year</u>	<u>Scale</u>	<u>Details</u>	<u>Source</u>
1946	Aerial Photograph. Scale: 1"=655'	Flight Year: 1946	Jack Ammann
1956	Aerial Photograph. Scale: 1"=655'	Flight Year: 1956	Clyde Sunderland
1965	Aerial Photograph. Scale: 1"=333'	Flight Year: 1965	Cartwright
1975	Aerial Photograph. Scale: 1"=550'	Flight Year: 1975	NASA
1982	Aerial Photograph. Scale: 1"=690'	Flight Year: 1982	USGS
1993	Aerial Photograph. Scale: 1"=666'	Flight Year: 1993	USGS
1998	Aerial Photograph. Scale: 1"=666'	Flight Year: 1998	USGS
2005	Aerial Photograph. Scale: 1"=604'	Flight Year: 2005	EDR



INQUIRY #: 2781761.5

YEAR: 1946

| = 655'







INQUIRY #: 2781761.5

YEAR: 1956



= 655'





INQUIRY #: 2781761.5

YEAR: 1965

| = 333'







INQUIRY #: 2781761.5

YEAR: 1975

| = 550'







INQUIRY #: 2781761.5

YEAR: 1982

— = 690'







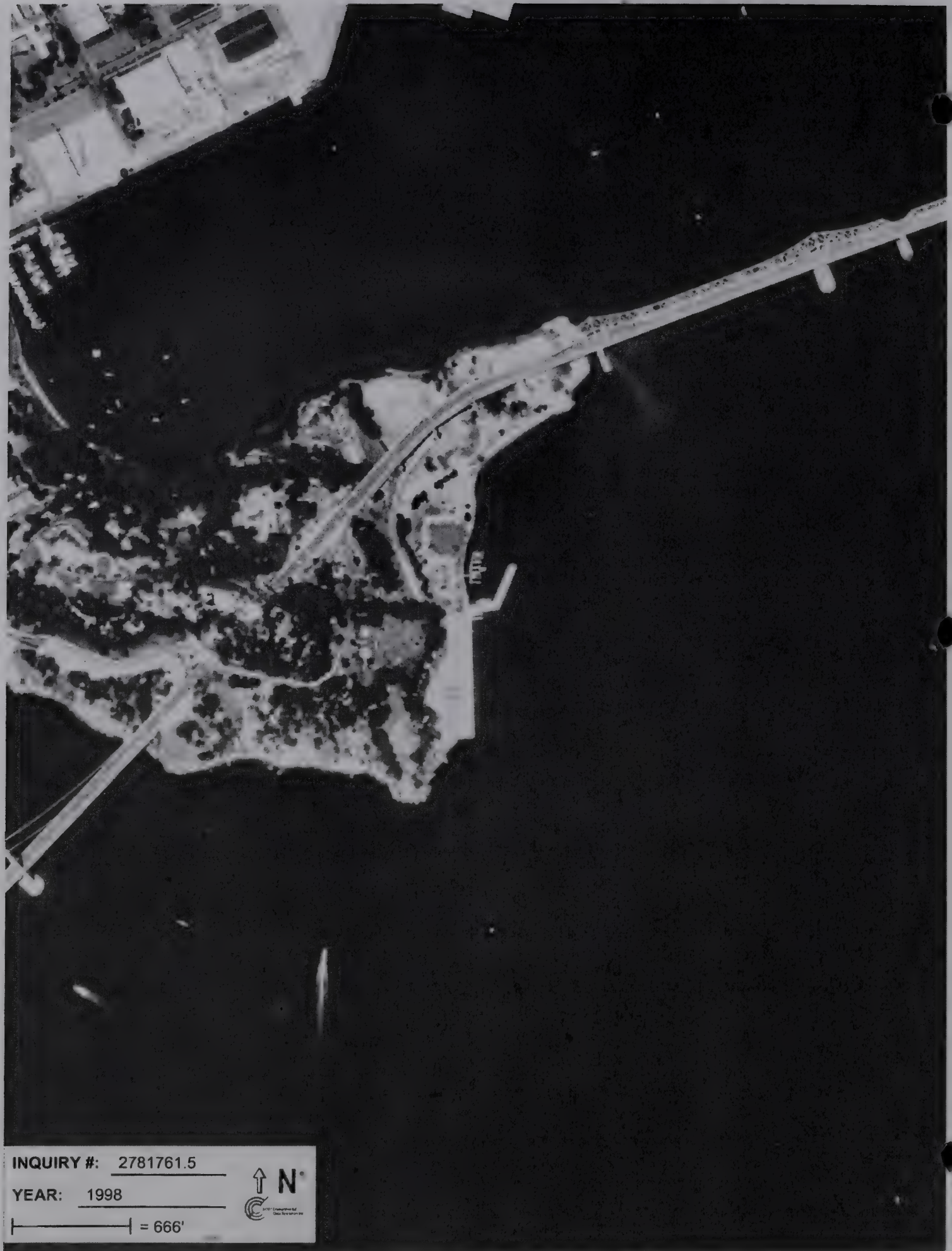
INQUIRY #: 2781761.5

YEAR: 1993

| = 666'







INQUIRY #: 2781761.5

YEAR: 1998

| = 666'







INQUIRY #: 2781761.5

YEAR: 2005

| = 604'







## **Sanborn Fire Insurance Map Search**





**Yerba Buena Island Offramps**

Gate Road/4th Street

San Francisco, CA 94130

Inquiry Number: 2781761.3

June 01, 2010

**Certified Sanborn® Map Report**

## Certified Sanborn® Map Report

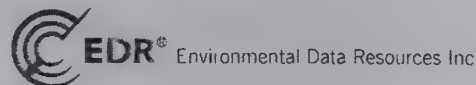
6/01/10

**Site Name:**

Yerba Buena Island Offramps  
Gate Road/4th Street  
San Francisco, CA 94130

**Client Name:**

AECOM  
999 West Town & Country  
Orange, CA 92868



EDR Inquiry # 2781761.3

Contact: Robert Olsen

The complete Sanborn Library collection has been searched by EDR, and fire insurance maps covering the target property location provided by AECOM were identified for the years listed below. The certified Sanborn Library search results in this report can be authenticated by visiting [www.edrnet.com/sanborn](http://www.edrnet.com/sanborn) and entering the certification number. Only Environmental Data Resources Inc. (EDR) is authorized to grant rights for commercial reproduction of maps by Sanborn Library LLC, the copyright holder for the collection.

### Certified Sanborn Results:

**Site Name:** Yerba Buena Island Offramps  
**Address:** Gate Road/4th Street  
**City, State, Zip:** San Francisco, CA 94130  
**Cross Street:**  
**P.O. #** NA  
**Project:** 60046943.3060  
**Certification #** CC2D-4648-986B



Sanborn® Library search results  
Certification # CC2D-4648-986B

### UNMAPPED PROPERTY

This report certifies that the complete holdings of the Sanborn Library, LLC collection have been searched based on client supplied target property information, and fire insurance maps covering the target property were not found.

The Sanborn Library includes more than 1.2 million Sanborn fire insurance maps, which track historical property usage in approximately 12,000 American cities and towns. Collections searched:

- ✓ Library of Congress
- ✓ University Publications of America
- ✓ EDR Private Collection

*The Sanborn Library LLC Since 1866™*

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## City Directory Abstract





**Yerba Buena Island Offramps**

Gate Road/4th Street  
San Francisco, CA 94130

Inquiry Number: 2781761.6  
June 01, 2010

**The EDR-City Directory Abstract**

## TABLE OF CONTENTS

### SECTION

Executive Summary

Findings

***Thank you for your business.***  
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with any questions or comments.

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## 2009 Enhancements to EDR City Directory Abstract

New for 2009, the EDR City Directory Abstract has been enhanced with additional information and features. These enhancements will make your city directory research process more efficient, flexible, and insightful than ever before. The enhancements will improve the options for selecting adjoining properties, and will speed up your review of the report.

**City Directory Report.** Three important enhancements have been made to the EDR City Directory Abstract:

1. *Executive Summary.* The report begins with an Executive Summary that lists the sources consulted in the preparation of the report. Where available, a parcel map is also provided within the report, showing the locations of properties researched.
2. *Page Images.* Where available, the actual page source images will be included in the Appendix, so that you can review them for information that may provide additional insight. EDR has copyright permission to include these images.
3. *Findings Listed by Location.* Another useful enhancement is that findings are now grouped by address. This will significantly reduce the time you need to review your abstracts. Findings are provided under each property address, listed in reverse chronological order and referencing the source for each entry.

**Options for Selecting Adjoining Properties.** Ensuring that the right adjoining property addresses are searched is one of the biggest challenges that environmental professionals face when conducting city directory historical research. EDR's new enhancements make it easier for you to meet this challenge. Now, when you place an order for the EDR City Directory Abstract, you have the following choices for determining which addresses should be researched.

1. *You Select Addresses and EDR Selects Addresses.* Use the "Add Another Address" feature to specify the addresses you want researched. Your selections will be supplemented by addresses selected by EDR researchers using our established research methods. Where available, a digital map will be shown, indicating property lines overlaid on a color aerial photo and their corresponding addresses. Simply use the address list below the map to check off which properties shown on the map you want to include. You may also select other addresses using the "Add Another Address" feature at the bottom of the list.
2. *EDR Selects Addresses.* Choose this method if you want EDR's researchers to select the addresses to be researched for you, using our established research methods.
3. *You Select Addresses.* Use this method for research based solely on the addresses you select or enter into the system.
4. *Hold City Directory Research Option.* If you choose to select your own adjoining addresses, you may pause production of your EDR City Directory Abstract report until you have had a chance to look at your other EDR reports and sources. Sources for property addresses include: your Certified Sanborn Map Report may show you the location of property addresses; the new EDR Property Tax Map Report may show the location of property addresses; and your field research can supplement these sources with additional address information. To use this capability, simply click "Hold City Directory research" box under "Other Options" at the bottom of the page. Once you have determined what addresses you want researched, go to your EDR Order Status page, select the EDR City Directory Abstract, and enter the addresses and submit for production.

Questions? Contact your EDR representative at 800-352-0050. For more information about all of EDR's 2009 report and service enhancements, visit [www.edrnet.com/2009enhancements](http://www.edrnet.com/2009enhancements)

## EXECUTIVE SUMMARY

### DESCRIPTION

Environmental Data Resources, Inc.'s (EDR) City Directory Abstract is a screening tool designed to assist environmental professionals in evaluating potential liability on a target property resulting from past activities. EDR's City Directory Abstract includes a search and abstract of available city directory data. For each address, the directory lists the name of the corresponding occupant at five year intervals.

Business directories including city, cross reference and telephone directories were reviewed, if available, at approximately five year intervals for the years spanning 1910 through 2006. This report compiles information gathered in this review by geocoding the latitude and longitude of properties identified and gathering information about properties within 660 feet of the target property.

A summary of the information obtained is provided in the text of this report.

### RESEARCH SUMMARY

The following research sources were consulted in the preparation of this report. An "X" indicates where information was identified in the source and provided in this report.

<u>Year</u>	<u>Source</u>	<u>TP</u>	<u>Adjoining</u>	<u>Text Abstract</u>	<u>Source Image</u>
2006	Haines Company, Inc.	-	X	X	-
2000	Haines & Company	-	-	-	-
1993	Pacific Bell	-	-	-	-
1990	Pacific Bell	-	X	X	-
1985	Pacific Bell	-	X	X	-
1982	R. L. Polk Co.	-	-	-	-
1977	Pacific Telephone	-	-	-	-
1971	Pacific Telephone	-	-	-	-
1966	R. L. Polk & Co.	-	-	-	-
1962	R. L. Polk & Co.	-	-	-	-
1958	R. L. Polk & Co.	-	-	-	-
1953	R. L. Polk & Co.	-	-	-	-
1949	R. L. Polk & Co.	-	-	-	-
1944	R. L. Polk & Co.	-	-	-	-
1940	R. L. Polk & Co.	-	-	-	-
1935	R. L. Polk & Co.	-	-	-	-
1930	R. L. Polk & Co.	-	-	-	-
1925	R. L. Polk & Co.	-	-	-	-
1920	Pacific Telephone	-	-	-	-
1915	H. S. Crocker Co.	-	-	-	-
1910	H. S. Crocker Co.	-	-	-	-

## FINDINGS

### TARGET PROPERTY INFORMATION

#### ADDRESS

Gate Road/4th Street  
San Francisco, CA 94130

#### FINDINGS DETAIL

Target Property research detail.

No Addresses Found



## FINDINGS

### ADJOINING PROPERTY DETAIL

The following Adjoining Property addresses were researched for this report. Detailed findings are provided for each address.

### MACALLA CT

#### 301 MACALLA CT

<u>Year</u>	<u>Uses</u>	<u>Source</u>
2006	B KOULIKOVAJmka	Haines Company, Inc.
	SHIMONEKMicheal	Haines Company, Inc.
1990	PIER CHARLES A	Pacific Bell
	DUNN DAVID J	Pacific Bell
	SUMPTER TERRY LT	Pacific Bell
1985	SHAY WILLIAM F	Pacific Bell
	CALKINS DENNIS	Pacific Bell
	PETERSON DEAN & DEBBIE	Pacific Bell
	CARLSON RANDY DR	Pacific Bell
	DUNN DAVID J	Pacific Bell

## FINDINGS

### TARGET PROPERTY: ADDRESS NOT LISTED IN RESEARCH SOURCE

The following Target Property addresses were researched for this report, and the addresses were not listed in the research source.

#### Address Researched

Gate Road/4th Street

#### Address Not Listed in Research Source

2006, 2000, 1993, 1990, 1985, 1982, 1977, 1971, 1966, 1962, 1958, 1953, 1949, 1944, 1940, 1935, 1930, 1925, 1920, 1915, 1910

### ADJOINING PROPERTY: ADDRESSES NOT LISTED IN RESEARCH SOURCE

The following Adjoining Property addresses were researched for this report, and the addresses were not listed in research source.

#### Address Researched

301 MACALLA CT

#### Address Not Listed in Research Source

2000, 1993, 1982, 1977, 1971, 1966, 1962, 1958, 1953, 1949, 1944, 1940, 1935, 1930, 1925, 1920, 1915, 1910





## Historical Topographic Maps



**Yerba Buena Island Offramps**

Gate Road/4th Street

San Francisco, CA 94130

Inquiry Number: 2781761.4

June 01, 2010

**The EDR Historical Topographic Map Report**



# EDR Historical Topographic Map Report

Environmental Data Resources, Inc.'s (EDR) Historical Topographic Map Report is designed to assist professionals in evaluating potential liability on a target property resulting from past activities. EDR's Historical Topographic Map Report includes a search of a collection of public and private color historical topographic maps, dating back to the early 1900s.

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with any questions or comments.

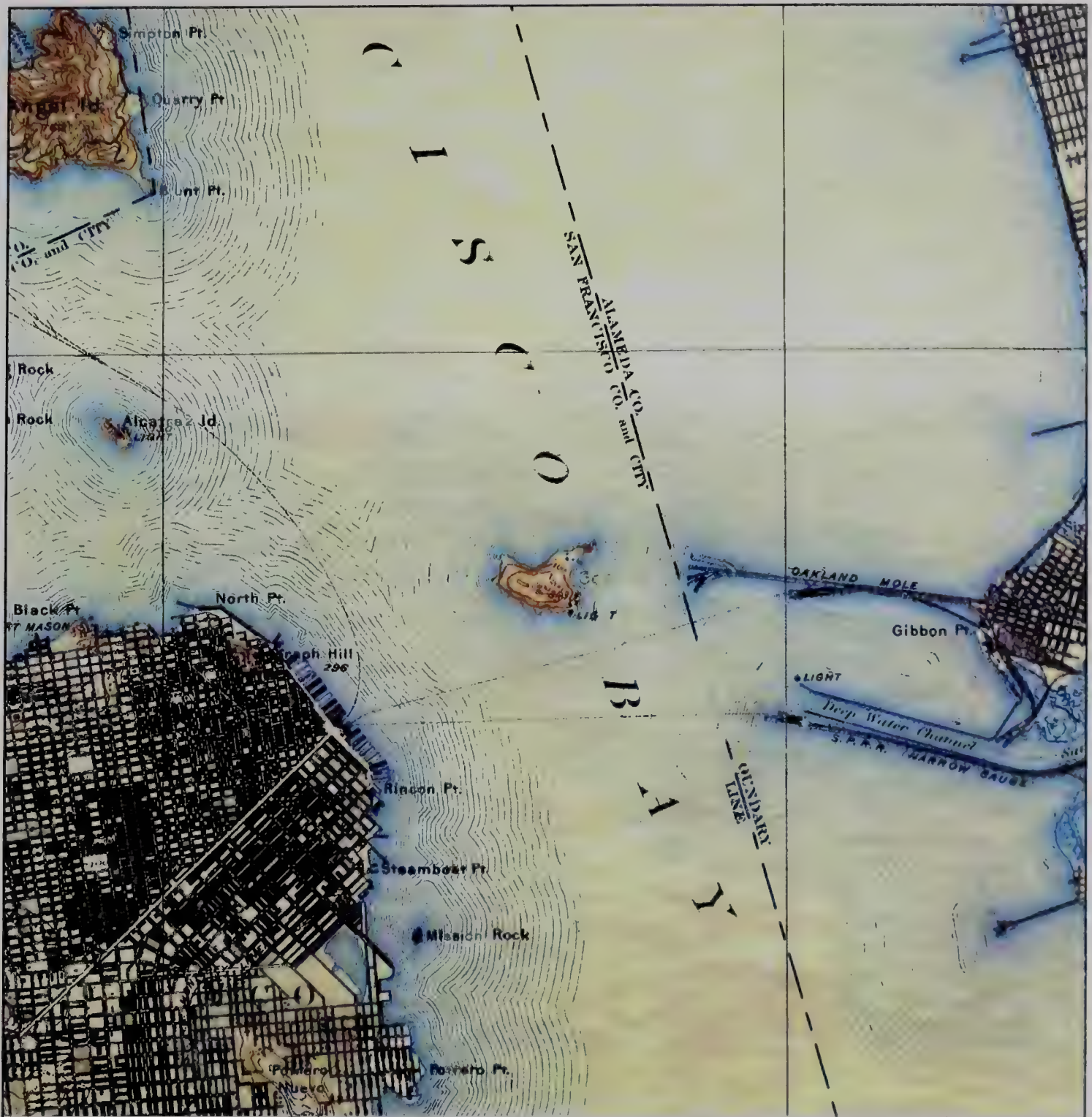
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# Historical Topographic Map




<p>N ↑</p>	<p>TARGET QUAD NAME: SAN FRANCISCO MAP YEAR: 1895</p> <p>SERIES: 15 SCALE: 1:62500</p>	<p>SITE NAME: Yerba Buena Island Offramps</p> <p>ADDRESS: Gate Road/4th Street San Francisco, CA 94130</p> <p>LAT/LONG: 37.8121 / 122.3625</p>	<p>CLIENT: AECOM CONTACT: Robert Olsen INQUIRY#: 2781761.4 RESEARCH DATE: 06/01/2010</p>
----------------	--	--	--



# Historical Topographic Map



	TARGET QUAD	SITE NAME:	Yerba Buena Island Offramps	CLIENT:	AECOM
	NAME: SAN FRANCISCO	ADDRESS:	Gate Road/4th Street	CONTACT:	Robert Olsen
	MAP YEAR: 1915		San Francisco, CA 94130	INQUIRY#:	2781761.4
	SERIES: 15	LAT/LONG:	37.8121 / 122.3625	RESEARCH DATE:	06/01/2010
	SCALE: 1:62500				



# Historical Topographic Map



<p>N ↑</p>	<p>TARGET QUAD NAME: SAN FRANCISCO MAP YEAR: 1948  SERIES: 15 SCALE: 1:50000</p>	<p>SITE NAME: Yerba Buena Island Offramps  ADDRESS: Gate Road/4th Street San Francisco, CA 94130  LAT/LONG: 37.8121 / 122.3625</p>	<p>CLIENT: AECOM CONTACT: Robert Olsen INQUIRY#: 2781761.4 RESEARCH DATE: 06/01/2010</p>
----------------	--	--	--

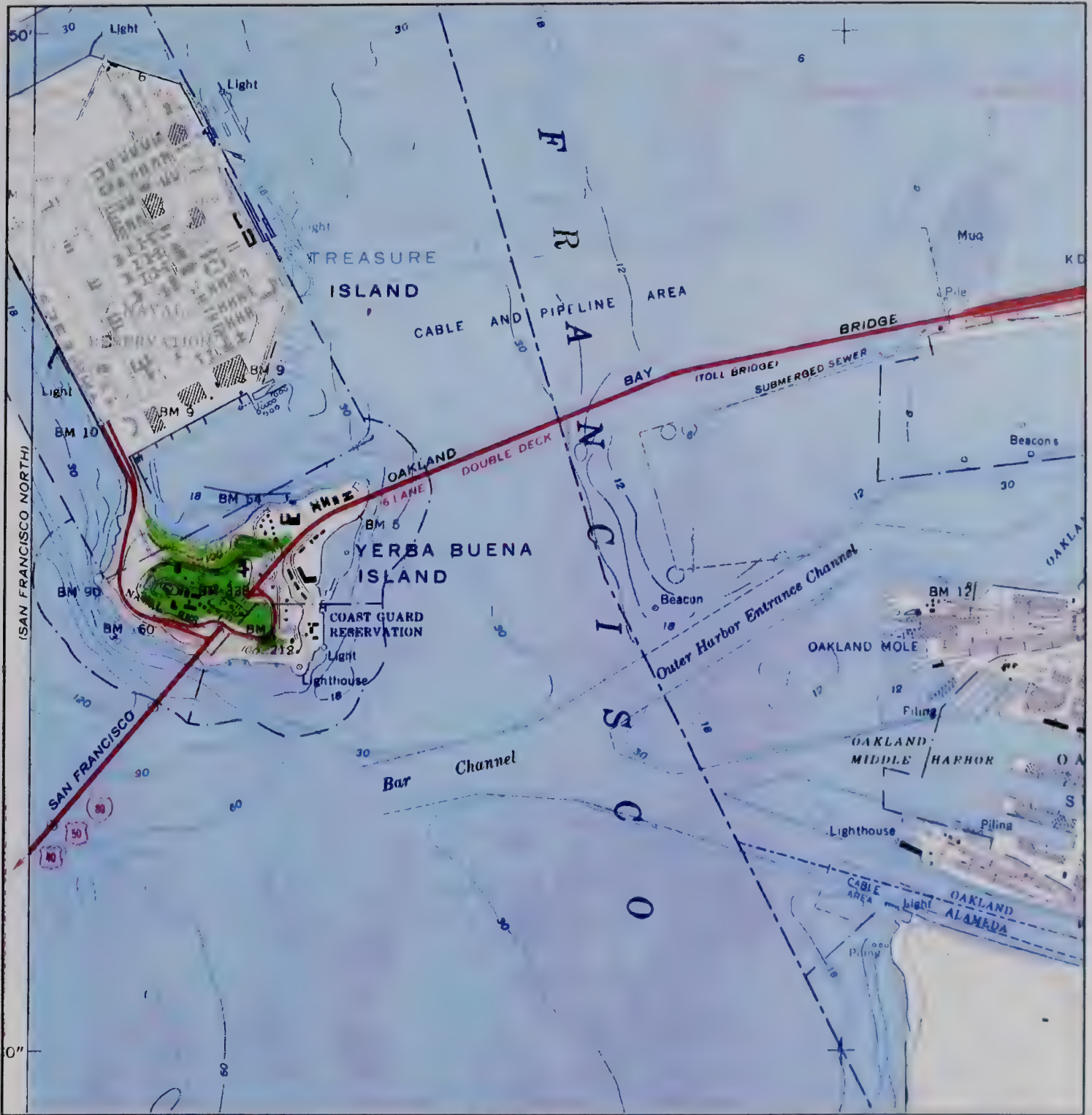
## Historical Topographic Map



<div>N</div> <div>↑</div>	TARGET QUAD	SITE NAME: Yerba Buena Island Offramps	CLIENT: AECOM
	NAME: OAKLANDWEST	ADDRESS: Gate Road/4th Street	CONTACT: Robert Olsen
	MAP YEAR: 1949	San Francisco, CA 94130	INQUIRY#: 2781761.4
	SERIES: 7.5	LAT/LONG: 37.8121 / 122.3625	RESEARCH DATE: 06/01/2010
	SCALE: 1:24000		



# Historical Topographic Map



<p>N ↑</p>	<p>TARGET QUAD NAME: OAKLANDWEST MAP YEAR: 1959</p> <p>SERIES: 7.5 SCALE: 1:24000</p>	<p>SITE NAME: Yerba Buena Island Offramps</p> <p>ADDRESS: Gate Road/4th Street San Francisco, CA 94130</p> <p>LAT/LONG: 37.8121 / 122.3625</p>	<p>CLIENT: AECOM CONTACT: Robert Olsen INQUIRY#: 2781761.4 RESEARCH DATE: 06/01/2010</p>
----------------	---	--	--



# Historical Topographic Map



<div> <p>N</p> </div> <p>TARGET QUAD  NAME: OAKLANDWEST  MAP YEAR: 1968  PHOTOREVISED FROM: 1959  SERIES: 7.5  SCALE: 1:24000</p>	<p>SITE NAME: Yerba Buena Island Offramps</p> <p>ADDRESS: Gate Road/4th Street  San Francisco, CA 94130</p> <p>LAT/LONG: 37.8121 / 122.3625</p>	<p>CLIENT: AECOM  CONTACT: Robert Olsen  INQUIRY#: 2781761.4  RESEARCH DATE: 06/01/2010</p>
--	---	---

# Historical Topographic Map



<p>N ↑</p> <p>TARGET QUAD NAME: OAKLANDWEST MAP YEAR: 1973 PHOTOREVISED FROM: 1959 SERIES: 7.5 SCALE: 1:24000</p>	<p>SITE NAME: Yerba Buena Island Offramps ADDRESS: Gate Road/4th Street San Francisco, CA 94130 LAT/LONG: 37.8121 / 122.3625</p>	<p>CLIENT: AECOM CONTACT: Robert Olsen INQUIRY#: 2781761.4 RESEARCH DATE: 06/01/2010</p>
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# Historical Topographic Map



<div> </div> <div> <p>TARGET QUAD  NAME: OAKLANDWEST  MAP YEAR: 1980  PHOTOREVISED FROM: 1959  SERIES: 7.5  SCALE: 1:24000</p> </div>	<div> <p>SITE NAME: Yerba Buena Island Offramps  ADDRESS: Gate Road/4th Street  San Francisco, CA 94130  LAT/LONG: 37.8121 / 122.3625</p> </div>	<div> <p>CLIENT: AECOM  CONTACT: Robert Olsen  INQUIRY#: 2781761.4  RESEARCH DATE: 06/01/2010</p> </div>
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# **APPENDIX E**

## ***Resume of Preparer***

**Robert Olsen, R.G., R.E.A.**  
*Senior Geologist*

**Education**

M.S., Geology, University of Oregon  
B.S., Geology, University of California, Los Angeles

**Registrations**

Registered Geologist, CA, 1990  
Registered Environmental Assessor, CA, 1992  
Registered Environmental Assessor II, 2001  
OSHA HAZWOPER, 40 Hours and Current 8-Hour Refresher

**Professional Affiliations**

National Groundwater Association  
South Coast Geological Society

**Years of Experience (updated 4/08)**

With AECOM: 15  
With other firms: 24

**Experience**

Mr. Olsen has over 30 years of experience as a geologist and hydrogeologist in the fields of environmental consulting, petroleum exploration and groundwater resource development. He has managed projects including geological and hydrogeological investigations, drilling and monitoring well installation, environmental site assessments, borehole geophysical logging, geotechnical sampling, aquifer tests, and subsurface mapping. In addition, Mr. Olsen has served as liaison with regulatory agencies to determine the applicable regulations that apply to property transfer site assessments, soil and groundwater characterization studies, and uncontrolled releases.

**Selected Projects**

**U.S. Navy Landfill, San Clemente Island, CA.** Senior Project Geologist for the preparation of a Solid Waste Assessment Test Workplan for a landfill that had previously not been evaluated for its potential for leachate generation; installed soil borings and lysimeters using hollow-stem auger and air-percussion drilling rigs; sampled lysimeters; prepared Solid Waste Assessment Test report for submittal to Los Angeles Regional Water Quality Control Board.

**Contamination Site, Visalia, CA.** Project Geologist for site investigation at a major TCE contamination site in Central California. Project included the organization and implementation of a domestic well sampling program, investigation and abandonment of a dry well system, plume characterization, site history research, pilot soil vapor extraction system installation, groundwater and soil sampling, and the drilling and installation of groundwater-monitoring and groundwater-extraction wells.

**Naval Station San Diego, CA.** Project Manager responsible for analyzing the results of past investigations at 10 underground storage tank facilities where unauthorized releases were suspected to have occurred. He determined the locations of planned groundwater monitoring wells, prepared the Work Plans and Health and Safety Plans for Phase II Environmental Site

Assessments in accordance with applicable state, local, and Navy regulations, and interpreted the results of geotechnical testing to determine the design of future monitoring wells and remediation by vapor extraction.

**Private and Public Clients, California - Nevada - Arizona.** Project Manager for numerous Phase II Environmental Site Assessments at commercial and industrial sites where soil and/or ground water contamination was known or suspected. Prepared Workplans and Health and Safety Plans as required; maintained liaison with regulatory agencies; supervised drilling, field observations of indications of contamination, and the collection of soil and ground water samples; interpreted the results of laboratory analyses; and prepared reports with recommendations for site closure, further investigation or remediation, as appropriate.

**Service Station, Anaheim, CA.** Project Geologist performing Phase II Environmental Site Assessment and Phase II remediation at a service station where a piping leak had resulted in soil and ground water contamination by gasoline; installed ground water monitoring wells, vapor extraction wells, and soil borings; evaluated remedial alternatives; monitored the operation of a vapor extraction system; supervised the remediation of contaminated soil by pattern drilling; coordinated activities with City agencies when the contaminated part of the site was condemned for street widening.

**Proposed School Sites, Chula Vista and Rancho Cucamonga, CA.** Performed Preliminary Endangerment Assessments at sites where former agricultural lands were to be redeveloped for elementary and magnet school use; prepared Workplans, Health and Safety Plans, and Quality Assurance Project Plans; coordinated with school districts and the California Department of Toxic Substances Control to ensure that the project were completed in a timely manner and approved for school development.

**Former Aerospace Research and Testing Facility, San Diego, CA.** Performed Phase II Environmental Site Assessments and Preliminary Endangerment Assessment at a former rocket testing and research facility that was to be redeveloped for residential housing; researched and tested for the potential impact of perchlorate releases to surface soils.

**South Orange County Transportation Infrastructure Improvement Project, Orange County, California:** Produced the Hazards and Hazardous Materials Technical Report, a CEQA/NEPA document describing potential hazardous-materials concerns associated with the proposed extension of State Route 273 from Irvine to San Clemente. Evaluated existing potentially contaminated sites and the impacts to the environment from the construction and operation of the proposed toll road. Applied the information obtained from the Technical Report study to the review and evaluation of the Hazards and Hazardous Materials section of the Environmental Impact Report for the project.

**Proposed Private High School Site, Yorba Linda, California:** Performed file review, Phase I and Phase II Environmental Site Assessments and a soil vapor survey on the site of a proposed Christian high school located in an area of historical oil production and citrus orchards. Conferred with and advised client's legal representatives regarding appropriate inquiries to be the equivalent of a Preliminary Endangerment Assessment if the site were eligible for Department of Toxic Substances Control Supervision. Testified before City Planning Commission and City Council regarding findings and the suitability of the site for the intended use.





## **APPENDIX P**

### **PALEONTOLOGICAL IDENTIFICATION REPORT**







Garcia and Associates  
1512 Franklin Street, Suite 100  
Oakland, CA 94612  
Phone: (510) 891-0024 Fax: (510) 891-0027

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**To:** Melanie Brent, Caltrans Environmental Planner  
**From:** Ferdinand Oberle, Paleontologist  
**Date:** October 20, 2010; revised December 2, 2010  
**RE:** Paleontological Identification Report (PIR) for the Yerba Buena Interchange Ramps Improvement Project

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#### **Introduction and Statement of Conformity**

This Paleontological Identification Report (PIR) describes potential paleontological resources at the Yerba Buena Interchange Ramps Improvement Project, Yerba Buena Island, San Francisco County, California. It has been prepared in conformance with the California Department of Transportation (Caltrans) Standard Environmental Reference, Volume I: Guidance for Compliance, Chapter 8 – Paleontology (Caltrans 2007).

#### **Methods**

##### ***Paleontological Study Area (PSA)***

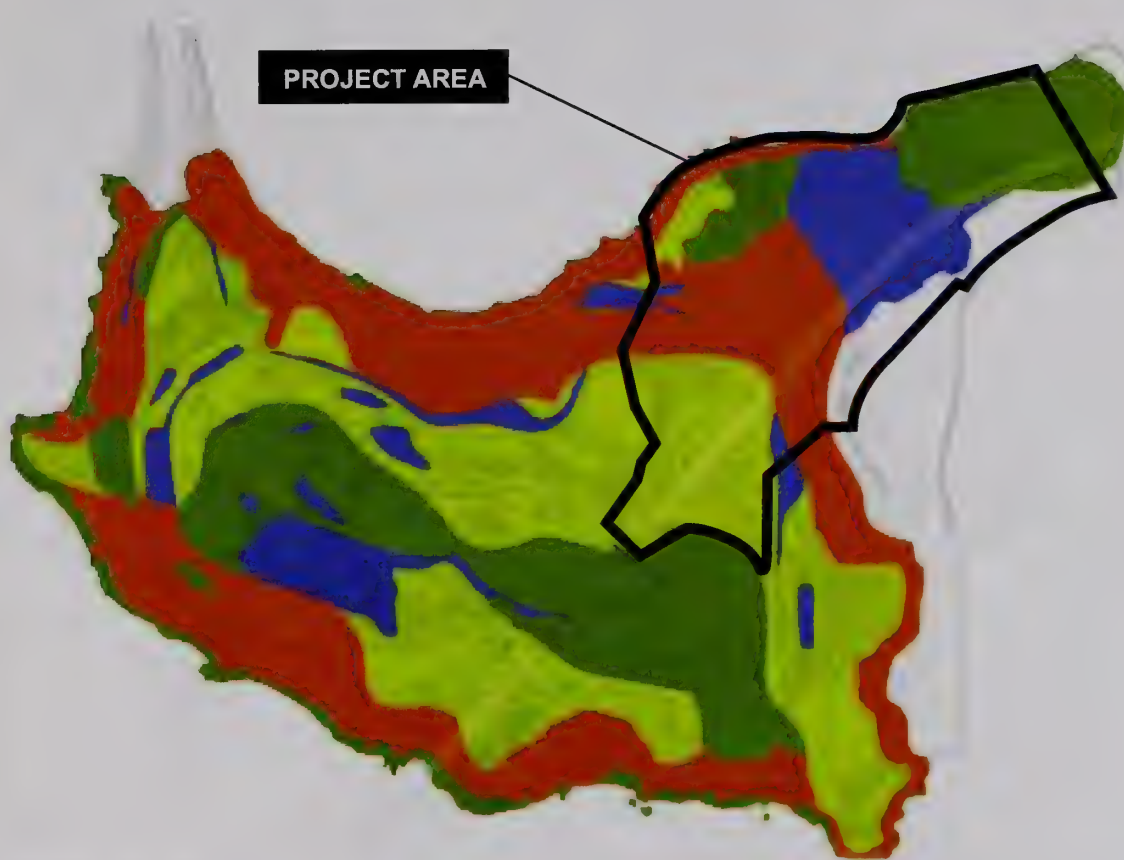
The paleontological study area (PSA) included the area connecting the San Francisco-Oakland Bay Bridge on Interstate 80 (I-80) to Macalla Road on Yerba Buena Island. The literature and map review and fossil locality search was performed for the entire PSA.

##### ***Data Sources Consulted***

Background research conducted for this project consisted of a literature and map review and a fossil locality search. This research identified the geologic units, previous paleontological studies, fossil localities (i.e., locations at which paleontological resources have been documented), and types of fossils in geologic units that may be within or adjacent to the project area (Figures 1 and 2). An online fossil locality search was conducted on 10.16.2010, using the Berkeley Natural History Museum (BNHM) online database, which includes data from the University of California, Museum of Paleontology (UCMP) (<http://bnhm.berkeley.edu/query/index.php>).

### ***Results of Field Survey***

Background research identified that the geologic units within the project area have low to high paleontological sensitivity. Ferdinand Oberle conducted a field survey of the project site on Oct. 15, 2010 (Figure 1). Mr. Oberle earned a M.Sc. in Environmental and Marine Geology from the University of Bremen in 2005, and has been a staff paleontologist with Garcia and Associates since 2007. He observed all geologic units identified by Graymer *et al.* (2000), Radbruch (1957) and HMP (2009) at the surface within the PSA or adjacent to the project footprint. No paleontological resources were observed during the survey.



#### Geologic Materials

- Franciscan Bedrock:**  
Sandstone, siltstone.
- Dune Sand and Alluvium:**  
Dense fine sand. Locally cemented with gravel lenses. Covering rock up to 80 feet thick.
- Colluvium and Landslide Debris:**  
Unstable loose sand and rock debris covering island.
- Manmade Fills:**  
Thin deposits under most roads and building pads. Thick deposits under causeway and Coast Guard port facilities.

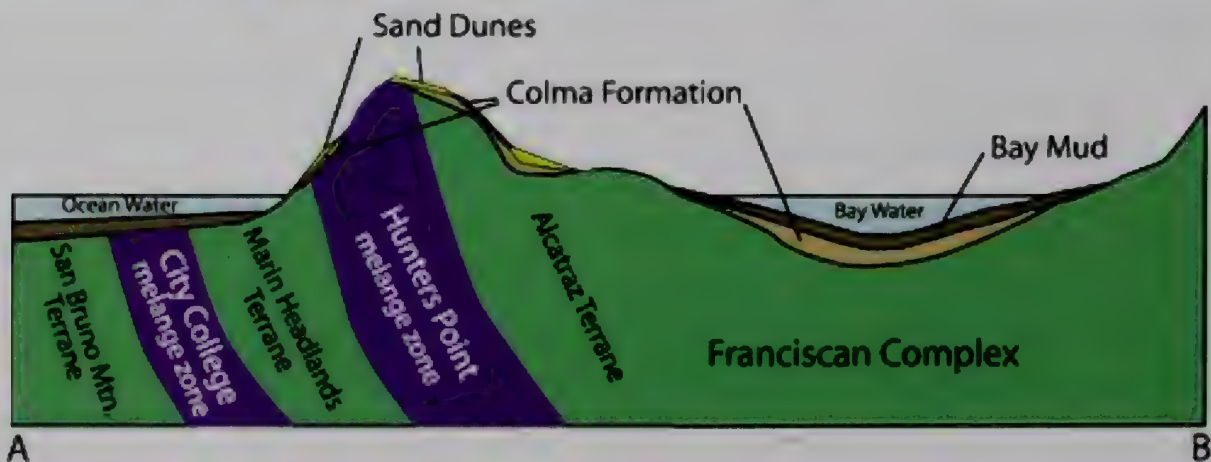
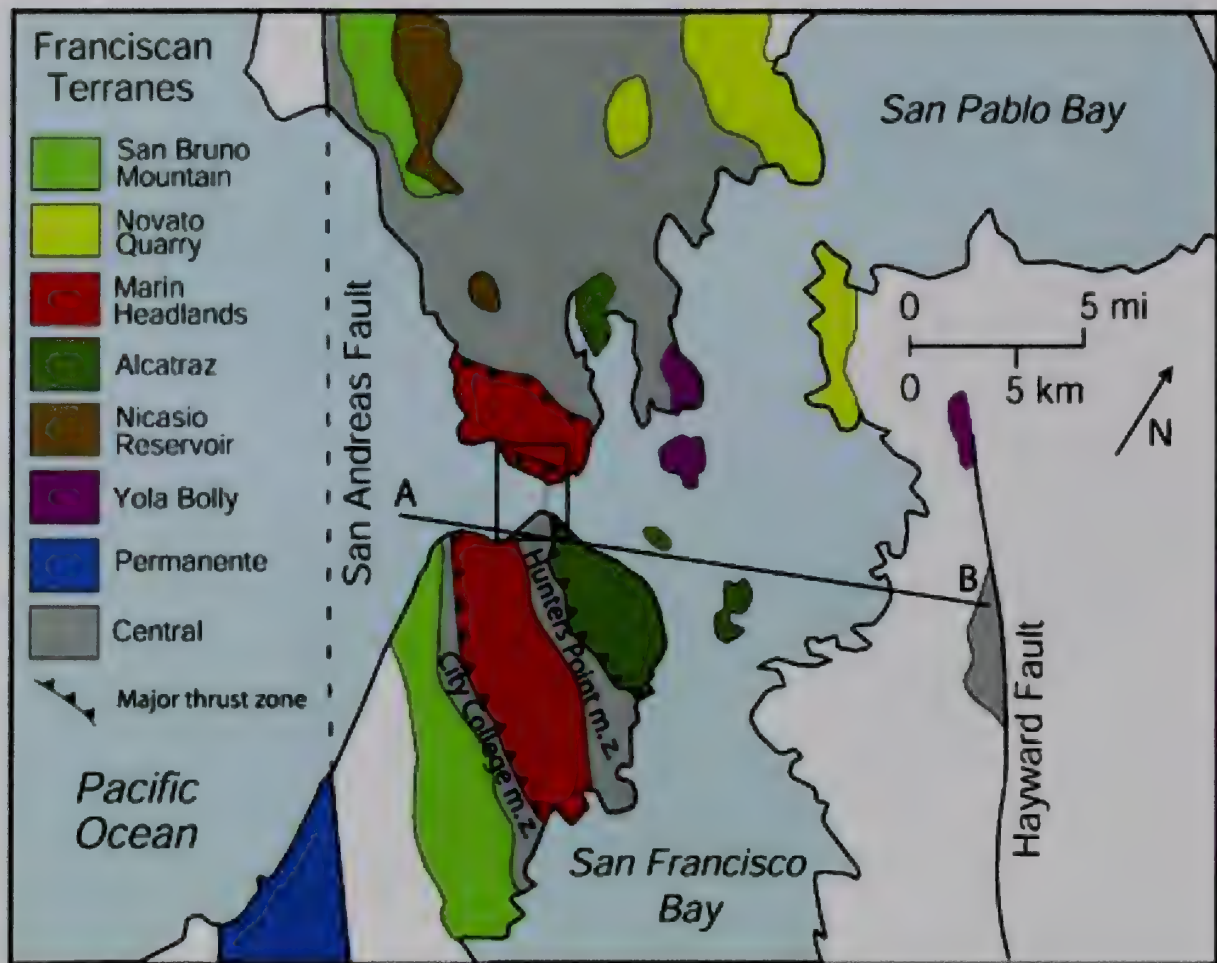
Source: Baise et al 2001



Not to Scale

**Figure 1**  
**Geologic Units in the Project Area**





Source: Elder, W. 2001



Not to Scale

**Figure 2**  
**Franciscan Complex and Colma Formation**

### **Geological Setting**

The valley in which San Francisco Bay resides began to form around 2 to 3 million years ago, when the surrounding mountains and hills started to rise on either side. YBI lies within the San Francisco Bay and is thought to have been uplifted by faulting along a branch of the Hayward Fault approximately 1 million years ago (CMB *et al.* 2009). Yerba Buena Island is underlain by Franciscan Formation basement rock consisting of interbedded graywacke sandstone, siltstone and claystone of varying proportions. Bedrock on the island is covered by thin sandy deposits from the Pleistocene Colma formation or derived from the underlying sandstone.

Sand covers most of the bedrock on the island, except along the lower parts of the slopes where waves have cleaned the rocks, and on northeast point. Grading in the late 1930s at the northeast point removed up to 50-60 feet off the top of the hill exposing slightly weathered bedrock. Artificial fill at the northeastern tip of the island was created in 1943 by placing cut materials from Yerba Buena Island and dredged bay deposits.

Native soils on YBI range from ten to 40 inches in depth and have been highly altered throughout the island by grading, excavating, filling, and otherwise reshaping topography. (Earth Mechanics 2010, CMB *et al.* 2009).

### ***Jurassic/Cretaceous – The Franciscan Complex***

The Jurassic/Cretaceous-age Franciscan Formation forms the bedrock of YBI and consists of interbedded sandstone, siltstone and claystone. The Franciscan Complex is a melange of rock units that were variably deformed and metamorphosed in a subduction zone at the western edge of the North American Plate (Hamilton, 1969; Page, 1981; Wakabayashi, 1992). Franciscan lithologies are predominantly meta-sedimentary rocks with subordinate volcanic rocks that are believed to represent trench fill and volcanic islands, respectively. In the Project area this unit is predominantly thick-bedded to massive sandstone with only a few thin beds of claystone or siltstone thus identifying it as part of the Alcatraz terrane. The bedding orientation dipping to the northeast is consistent with outcrops and other borings on the island (Fugro-EMI, 2001). The rock is commonly soft in the upper 5 to 15 feet where it has been altered by weathering. These weathered rocks are generally brown.

### ***Pleistocene - Colma Formation***

The Colma Formation is late Pleistocene in age. The Colma Formation is dated to 0.07-0.13 mya (Clifton *et al.* 1988; Konigsmark 1998). Sediments of the Colma Formation were deposited in either marine or non-marine environment (Clifton *et al.* 1987, 1988; Hengesh and Wakabayashi 1994). The Colma Formation may simply represent a facies change of the geological units known as Old Bay Mud or Yerba Buena Formation, which can be found in the presently marine environment underneath the bay bridge. Yate *et al.* (1990) describes the texture of the Colma Formation as "poorly unconsolidated sands" and muds. On Yerba Buena Island, the Colma Formation underlies Bay Mud and dune sand layers at varying depths and overlies the Franciscan Complex in some areas where it has not eroded away (Figure 2) (Elder, 2001). Surface outcrops of the Colma Formation have not been identified on YBI. The exact depth of Colma Formation on YBI is unknown. The geographically closest data concerning the depth of



the Colma formation comes from cores taken east of YBI from underneath the Bay Bridge. Here, the Colma formation has been identified to exist as close as 3.05 meters (10 feet) below Bay Mud (McGann et al., 2002). Because erosion rates can be higher on land than in a marine setting, it can be expected that the Colma formation exists at a depth of less than 3.05 meters (10 feet). An archaeological excavation identified a stratum that coincides lithologically with the Colma formation on YBI in a nearby location at a depth of 2 meters (6.5 feet) (Morgan et al., 2007). Geotechnical drilling for this project resulted in the identification of a lithological unit that coincides with the Colma Formation at a depth of approximately 2 meters (6.5 feet) (Earth Mechanics Inc., 2010).

#### ***Pleistocene to Recent-Colluvium and Landslide Debris***

A portion of the project area appears to have experienced shallow landslides. Similar but degraded slide scars can be seen on the slopes around the island indicating that these features have occurred in the past and are a recurring phenomenon. Landslides on YBI consist of two types: thin surficial soil slips and wedge failures involving Franciscan Formation bedrock. These landslides are generally small and occur where slopes have been over-steepened by erosion and excavations. The depth of these slides was on the order of about 2 to 5 feet.

#### ***Pleistocene to Recent -Dune Sand and Alluvium***

Quaternary dune sands typically cover the Colma Formation. Some of these dune sands were carried by the Sacramento River system through the Golden Gate and were deposited in eolian environment (Konigsmark 1998). The sands, characterized by excessive drainage of water, extended throughout most of western San Francisco before its development (Sullivan and Galehouse 1991), and supported the native grassland and scrub vegetation that once were widely distributed throughout the San Francisco peninsula.

The alluvium is composed primarily of fine-grained sand and silty sand with a few scattered silt and clay lenses. The colors of the alluvium are shades of brown ranging from yellowish-brown, brown, brownish-yellow, and dark brown. The material is loose to very dense and generally moist except on the upper slopes where it is locally dry to moist. The deposits are thick-bedded to unbedded; where bedding occurs it is generally horizontal to dipping about 20 degrees.

The great thickness and fine-grained nature of the sands along with their poor grading and widespread distribution in pockets across the island suggests these materials originated as wind-blown sands similar to those occurring on much of the San Francisco Peninsula. An archaeological excavation identified a stratum that coincides lithologically with the San Dunes on YBI in a nearby location between 0 to 2 meters (0 to 6.5 feet) (Morgan et al., 2007).

#### ***Recent- Artificial Fill***

Fill occurs locally across the island as road base, foundation support, and landscaping soil. Fill also occurs as uncompacted cast-over or disturbed surficial slough from the various historical development activities. Along the many roads around the island, cast-over grading material from the road building activities overlies, and is gradational with, native slope-wash sedimentary alluvium. Artificial fill occurs along the island shoreline east and south of the



Northeast Point at the Torpedo Building and Torpedo Road, and in the Coast Guard base in the southern Saddle Area. Most of the present U.S. Coast Guard Station is entirely on fill first placed around 1934.

The fill material within the Southern Saddle Area is up to about 9.1 meters (30 feet) thick. Exploratory excavation indicated the upper portion of the fill consists of brown to yellowish brown, moist, loose to medium dense, fine grained sands with some gravel. The lower portion consists of a coarser fraction composed of brown and gray sand and gravel material with large angular cobbles and boulders of the Franciscan Formation sandstone and siltstone.

### **Paleontological Sensitivity**

Paleontological resources include fossil plants and animals and other evidence of past life such as preserved animal tracks and burrows. As identified by the Society of Vertebrate Paleontology (SVP), the paleontological sensitivity of a geologic unit is determined by its potential to contain paleontological resources (SVP 1995). The paleontological sensitivity of a geologic unit may be classified as:

- **High Potential.** Rock units are considered to have a high potential for containing significant non-renewable fossiliferous resources if vertebrate or significant invertebrate fossils or significant suites of plant fossils have been recovered. These units include, but are not limited to, sedimentary and volcanic formations that contain significant nonrenewable paleontological resources and sedimentary rock units temporally or lithologically suitable for the preservation of fossils. Sensitivity comprises both of the following: (a) the potential for yielding abundant or significant vertebrate fossils or for yielding a few significant fossils that are large or small, vertebrate, invertebrate, or botanical; and, (b) the importance of recovered evidence for new and significant taxonomic, phylogenetic, ecologic, or stratigraphic data. Areas that contain potentially datable organic remains older than Recent and areas that may contain new vertebrate deposits, traces, or trackways are also classified as significant.
- **Undetermined Potential.** Specific areas underlain by sedimentary rock units for which little information is available are considered to have undetermined fossiliferous potentials. Field surveys by a qualified vertebrate paleontologist to specifically determine the potentials of the rock units are required before programs of impact mitigation for such areas may be developed.
- **Low Potential.** Reports in the paleontological literature or field surveys by a qualified vertebrate paleontologist may allow determination that some areas or units have low potentials for yielding significant fossils. Such units will be poorly represented by specimens in institutional collections. These deposits generally will not require protection or salvage operations.

Caltrans uses a similar three-part scale for assessing the sensitivity or potential for a particular rock unit to contain paleontological resources (Caltrans 2007). These two classification systems are compatible. In most cases, decisions about how to manage paleontological resources must be based on this potential because the actual situation can not be known until construction

excavation for the project is underway:

- **High Potential.** Rock units which, based on previous studies, contain or are likely to contain significant vertebrate, significant invertebrate, or significant plant fossils. These units include, but are not limited to, sedimentary formations that contain significant nonrenewable paleontological resources anywhere within their geographical extent, and sedimentary rock units temporally or lithologically suitable for the preservation of fossils. These units may also include some volcanic and low-grade metamorphic rock units. Fossiliferous deposits with very limited geographic extent or an uncommon origin (e.g., tar pits and caves) are given special consideration and ranked as highly sensitive. High sensitivity includes the potential for containing: (1) abundant vertebrate fossils; (2) a few significant fossils (large or small vertebrate, invertebrate, or plant fossils) that may provide new and significant taxonomic, phylogenetic, ecologic, and/or stratigraphic data; (3) areas that may contain datable organic remains older than Recent, including *Neotoma* (sp.) middens; or (4) areas that may contain unique new vertebrate deposits, traces, and/or trackways. Areas with a high potential for containing significant paleontological resources require monitoring and mitigation.
- **Low Potential.** This category includes sedimentary rock units that: 1) are potentially fossiliferous, but have not yielded significant fossils in the past; 2) have not yet yielded fossils, but possess a potential for containing fossil remains; or 3) contain common and/or widespread invertebrate fossils if the taxonomy, phylogeny, and ecology of the species contained in the rock are well understood. Sedimentary rocks expected to contain vertebrate fossils are not placed in this category because vertebrates are generally rare and found in more localized stratum. Rock units designated as low potential generally do not require monitoring and mitigation. However, as excavation for construction gets underway it is possible that new and unanticipated paleontological resources might be encountered. If this occurs, a Construction Change Order (CCO) must be prepared in order to have a qualified Principal Paleontologist evaluate the resource. If the resource is determined to be significant, monitoring and mitigation is required.
- **No Potential.** Rock units of intrusive igneous origin, most extrusive igneous rocks, and moderately to highly metamorphosed rocks are classified as having no potential for containing significant paleontological resources. For projects encountering only these types of rock units, paleontological resources can generally be eliminated as a concern when the PEAR is prepared and no further action taken.

SVP identifies vertebrate fossils, their taphonomic and associated environmental data, and fossiliferous deposits as significant nonrenewable paleontological resources. Botanical and invertebrate fossils and assemblages may also be considered significant (SVP 1995). Due to the rarity of fossils and the scientific information they provide, a paleontological resource can be considered significant (Scott and Springer 2003) if the resource does any of the following:

- Provides data on the evolutionary relationships and developmental trends among organisms, both living and extinct;



- Provides data useful in determining the age(s) of the geologic unit or stratigraphy, as well as timing of associated geological events;
- Provides data on a community level;
- Demonstrates unusual or spectacular circumstances in the history of life; and / or
- Is not abundant or found in other geographic locations and may be in danger of being depleted or destroyed by the elements or vandalism.

Significant paleontological resources must be diagnostic to determine if any of the criteria above is applicable. Proper identification of paleontological resources is often difficult in the field; therefore, the recovery, preparation and analysis of paleontological resources is necessary to determine their significance (Scott and Springer 2003). This process must be done by, or under the supervision of, a qualified paleontologist (Conformable Impact Mitigation Guidelines Committee 1995). Microvertebrate fossils are generally not visible to the naked eye; although initial sifting may be conducted in the field, analysis for microinvertebrates requires laboratory processing of bulk samples from paleontologically sensitive geologic units (Conformable Impact Mitigation Guidelines Committee 1995; Scott and Springer 2003).

#### **Paleontological Resources within the Project Area**

The results of the literature review and the online fossil locality search using the Berkeley Natural History Museum (BNHM) online database, which includes data from the University of California, Museum of Paleontology (UCMP) found 122 fossil localities within San Francisco County. These include 1 specimen from the Jurassic, 4 from the Cretaceous, 3 from the Miocene, 6 from the Pliocene, 102 from the late Quaternary, 1 from the Holocene and 5 of unknown age.

#### ***The Franciscan Complex and the Alcatraz Terrane***

The Franciscan formation is heavily deformed and metamorphosed in many locations, and whatever fossils existed in these strata have been destroyed. Fossils from the Franciscan formation are therefore generally rare and are all the more important, because they can provide information on the age of a particular sedimentary suite, fixing it in the comparatively vast 150 million years spanned by the formation. Fossils recorded from the Franciscan formation of coastal California include trace fossils (preserved tracks or other signs of the behaviors of animals), mollusks, and marine reptiles.

The Alcatraz Terrane, the portion of the Franciscan complex found within YBI, contains fossils. In fact, the first fossil ever found in what was then called the Franciscan Formation, came from the Alcatraz Terrane (Graymer *et al.* 2000). This fossil consisted of an *Inoceramus elliotti* of Cretaceous age. Subsequent fossil discoveries include several other molluscan fossils of Cretaceous age. While all other terranes of the Franciscan Complex usually carry a moderate paleontological sensitivity, the fossil finds of the Alcatraz Terrane are highly important in contributing to the understanding of the depositional environment thus giving this unit on YBI a high paleontological sensitivity.

#### ***The Colma Formation***

The Colma Formation has produced significant marine and terrestrial fossils in the past.



Rodda and Baghai (1993) reported bones and teeth of mammoth and extinct bison from sands and clays unconformably overlying the Franciscan Complex that they refer to as the Colma Formation. Marine facies of the Colma Formation have produced marine megafossils, marine and nonmarine diatoms, and sponge spicules (Schlocker, 1974). Savage (1951) listed other vertebrate fossil localities in the San Francisco Bay region to which he assigned an "undifferentiated Pleistocene" age. Some of these additional vertebrate fossils may also be referable to the Colma Formation. Schlocker (1974) reported fossil plant remains and a peat layer at the top of his Colma Formation possibly representing "an old soil that developed in or near local marshes or lakes." Within San Francisco this geological unit is the most abundant collection of Pleistocene vertebrates. On YBI, the Colma Formation has not been mapped and is not known to occur in surface deposits but is likely to overlie portions of the Alcatraz Terrane, beneath deposits of dune sand or Old Bay Mud. This geological unit has a high paleontological sensitivity.

#### ***Colluvium and Landslide Debris***

These deposits are generally considered to be too young to contain significant fossils (10,000 years old to recent). They are less likely to contain well-preserved fossils than intact older parent deposits, and are thus considered to have a low paleontological resource potential.

#### ***Dune Sand and Alluvium***

Dune sand and alluvium are intermixed in the project area and are thus considered together. They consist of Holocene to Pleistocene sediments, increasing in age with depth (Graymer, 2000). Due to their lack of good preservational abilities, Pleistocene dune sands rarely contain fossils. This geological unit has a low paleontological sensitivity.

#### ***Artificial Fill***

Artificial fill could have fragmentary fossil material transported from other sites. Even if such were the case, this material would be out of stratigraphic context and, therefore, have no scientific value and minimal, if any, educational value due to its lack of context and fragmentary nature. Therefore, artificial fill has a low paleontological sensitivity.

### **Regulatory Context**

#### ***Federal***

Several federal laws protect paleontological resources on federal lands as well as projects undertaken by federal agencies.

#### **Antiquities Act of 1906**

The Antiquities Act of 1906 (16 United States Code [USC] 431-433) has been cited in past efforts to protect paleontological resources on federal lands, and is recognized for regulation of the collecting of vertebrate fossils on land managed by the BLM, National Park Service, Forest Service, Department of Energy and other federal agencies.

#### **National Environmental Policy Act of 1969**

The National Environmental Policy Act (NEPA, 42 United States Code [USC] 4321) directs

Federal agencies to "Preserve important historic, cultural, and natural aspects of our national heritage..." (Section 101(b) (4)). Regulations for implementing the procedural provisions of NEPA are found in 40 CFR 1500 1508. CEQ NEPA regulations identify mitigation in the NEPA process as measures to avoid, minimize, rectify, reduce, or compensate for environmental impacts (40 CFR 1508.20).

#### Federal Land Policy and Management Act of 1976

The Federal Land Policy and Management Act (FLPMA, 43 USC 1701-1782) authorizes inventories of paleontologic resources on federal land managed by the Bureau of Land Management (BLM), which now issues permits for collecting paleontological resources (fossils).

#### Paleontological Resources Preservation Act of 2009

The Paleontological Resources Preservation Act (PRPA), is part of the Omnibus Public Land Management Act of 2009 (Public Law 111-011 Subtitle D). This act directs the Secretary of the Interior or the Secretary of Agriculture to manage and protect paleontological resources on federal land, and develop plans for inventorying, monitoring, and deriving the scientific and educational use of such resources. It prohibits the removal of paleontological resources from federal land without a permit issued under this Act, establishes penalties for violation of this act and establishes a program to increase public awareness about such resources. The bill imposes criminal penalties for violating this Act, which includes serving up to 10 years in prison if convicted.

#### ***State and Local***

The following State laws pertain to paleontological resources. No local regulations pertaining to paleontological resources were identified.

#### California Environmental Quality Act

The California Environmental Quality Act requires that a determination be made as to whether a project would directly or indirectly destroy a unique paleontological resource or site or a unique geological feature (CEQA Guidelines, Appendix G (V)c). If an impact is significant, the State CEQA Guidelines require "feasible measures which could minimize significant adverse impacts" (State CEQA Guidelines Section 15126.4). State CEQA Guidelines Section 15370 also defines mitigation as:

- (a) Avoiding the impact altogether by not taking a certain action or parts of an action.
- (b) Minimizing impacts by limiting the degree or magnitude of the action and its implementation.
- (c) Rectifying the impact by repairing, rehabilitating, or restoring the impacted environment.
- (d) Reducing or eliminating the impact over time by preservation and maintenance operations during the life of the action.

(e) Compensating for the impact by replacing or providing substitute resources or environments.

#### Public Resources Code § 5097.5

California Public Resources Code § 5097.5 prohibits excavation or removal of any "vertebrate paleontological site, or any other archaeological, paleontological or historical feature, situated on public lands, except with the express permission of the public agency having jurisdiction over such lands." Public lands are defined to include lands owned by or under the jurisdiction of the state or any city, county, district, authority or public corporation, or any agency thereof. Section 5097.5 states that any unauthorized disturbance or removal of archaeological, historical, or paleontological materials or sites located on public lands is a misdemeanor.

#### **Potential Impacts to Paleontological Resources**

Construction activities can impact paleontologically sensitive geologic units when vehicles or other work equipment impact previously undisturbed sediments by excavating, grading, or crushing bedrock exposed in or underlying a project. This can result in significant impacts to fossils by destroying them or otherwise altering them in such a way that their scientific value is lost.

The proposed project would replace the existing westbound on-ramp and the westbound off-ramp located on the eastern side of YBI with a new westbound on-ramp and a new westbound off-ramp that would improve the functional roles of the current ramps.

Alternative 2b includes removal of the existing westbound on- and off-ramps on the east side of YBI, construction of a westbound hook on-ramp from Macalla Road on the east side of YBI, and construction of a westbound off-ramp to Macalla Road on the east side of YBI. Alternative 4 includes the removal of the existing westbound on- and off-ramps on the east side of YBI, construction of the westbound on-ramp from South Gate Road, and construction of the westbound off-ramp to Macalla Road on the east side of YBI.

Ground-disturbing activities within the PSA could potentially impact paleontological resources. The paleontologically sensitive Franciscan Complex/Alcatraz Terrane can be found directly underneath the paleontologically sensitive Colma Formation (see Figure 1), and both would be affected by construction activities.

#### **Avoidance, Minimization, and Mitigation Measures**

In general, avoidance and minimization are not feasible with regard to addressing significant impacts on paleontological resources. Geologic formations are usually extensive, and project design cannot be adjusted sufficiently to effectively avoid or minimize paleontological impacts. As a result, mitigation is the approach generally taken to address paleontological impacts.

Follow Caltrans' mitigation measures for paleontological resources per Standard Environmental Reference guidelines (Caltrans 2007). Caltrans will implement the following measures as



applicable to the selected alternative:

- a. A qualified paleontologist will be present to consult with grading and excavation contractors at pre-grading meetings.
- b. A paleontological monitor, under the direction of the qualified principal paleontologist, will be on site to inspect cuts for fossils at all times during original grading involving sensitive geologic formations.
- c. When fossils are discovered, the paleontologist (or paleontological monitor) will recover them. Construction work in these areas will be halted or diverted to allow recovery of fossil remains in a timely manner.
- d. Fossil remains collected during the monitoring and salvage portion of the mitigation program will be cleaned, repaired, sorted, and cataloged.
- e. Prepared fossils, along with copies of all pertinent field notes, photos, and maps, will then be deposited in a scientific institution with paleontological collections.
- f. A final report will be completed that outlines the results of the mitigation program.

### **Additional Recommendations for Mitigating Impacts to Paleontological Resources**

#### ***Onsite Training***

Onsite training should be conducted for all construction personnel who will work in excavated areas in the of the project area (Figure 1). Training will discuss the types of paleontological resources that could be encountered on the project and the procedures to be followed if they are discovered.

#### ***Monitoring of Construction Activities***

Ground disturbing excavations include pile driving and column foundation construction. The minimum excavation depth for these construction activities is approximately 12.2 meters (40 feet). Ground disturbing activities are expected to penetrate paleontologically sensitive units throughout the PSA.

Monitoring of project-related, ground-disturbing activities within the Franciscan Complex and the overlying Colma formation should occur. The following includes the areas and depth parameters when monitoring should occur:

- In areas where the Franciscan Bedrock is mapped (as shown on Figure 1).
- If ground disturbances exceed 2 meters (6.5 feet) in depth in the areas mapped as Dune Sand and Alluvium (as shown on Figure 1).
- If ground disturbances exceed 2.6 meters (8.5 feet) where Colluvium and Landslide Debris are mapped (2 meters [6.5 feet] for Dune Sands and 0.6 meters [2 feet] for Landslides) (as shown on Figure 1).
- If ground disturbances exceed 9.1 meters (30 feet) in depth the southern saddle area where Manmade Fill is mapped (as shown on Figure 1).

Monitoring should continue until a paleontologist has determined that the paleontologically

sensitive units are not being impacted or do not contain paleontological materials. Periodic sampling of excavated material of the Franciscan Complex and Colma Formation will determine whether they contain sensitive paleontological resources. Monitoring, sampling, data recovery, reporting, and curation activities should take place in accordance with the professional standards determined by the Society of Vertebrate Paleontology (Conformable Impact Mitigation Guidelines Committee 1995).

#### *Unanticipated Discovery*

In the event fossils are discovered in an area where monitoring is not being performed, the following guidelines should be followed:

- Stop all construction work within a 15.24 meter (50 foot) radius of the find until a qualified paleontologist can assess the significance of the find. If the discovery is significant or potentially significant, then potential mitigation will include:
  - Data recovery and analysis,
  - Preparation of a data recovery report, and
  - Accessioning recovered fossil material to an accredited paleontological repository, such as the University of California's Museum of Paleontology.

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## **APPENDIX Q**

### **PRELIMINARY FOUNDATION MEMORANDUM**



**PRELIMINARY FOUNDATION MEMORANDUM**  
**YERBA BUENA ISLAND RAMPS IMPROVEMENT**  
**PROJECT ON EAST SIDE OF ISLAND**

**WESTBOUND ON-RAMP**  
**WESTBOUND OFF-RAMP**

*Prepared By:*

AECOM TRANSPORTATION  
2101 Webster Street, Suite 1900  
Oakland, CA 94612

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## TABLE OF CONTENTS

<u>Section</u>	<u>Page</u>
<b>1.0 INTRODUCTION.....</b>	<b>1</b>
1.1 Purpose and Scope of Study .....	1
1.2 Project Description .....	1
<b>2.0 FIELD INVESTIGATION AND LABORATORY TESTING.....</b>	<b>3</b>
2.1 Existing Data Review .....	3
2.2 Field Investigation .....	4
2.3 Laboratory Testing.....	5
<b>3.0 GEOLOGICAL SETTING.....</b>	<b>5</b>
3.1 Regional Geological Structure.....	5
3.2 Local Geology Overview.....	6
3.3 Local Stratigraphy.....	6
3.4 Local Geological Structure .....	9
3.5 Groundwater .....	10
3.6 Regional Seismicity.....	10
3.7 Geologic hazards .....	11
3.8 Seismic Hazards .....	13
<b>4.0 CONCLUSIONS AND RECOMMENDATIONS.....</b>	<b>15</b>
4.1 Idealized Soil Profiles And Engineering Properties .....	15
4.2 Seismic Design Criteria .....	15
4.3 Soil Corrosivity.....	18
4.4 Existing Foundation Data .....	18
4.5 Pile Foundation Design .....	19
<b>5.0 CONSTRUCTION RECOMMENDATIONS.....</b>	<b>25</b>
5.1 Earthwork .....	25
5.2 Pile Construction .....	27
5.3 Abutment Walls.....	28

## **1.0 INTRODUCTION**

### **1.1 PURPOSE AND SCOPE OF STUDY**

The project is proposed to address present geometric and operational deficiencies of the existing westbound on and off-ramps and the effects on the San Francisco-Oakland Bay Bridge (I-80) mainline.

AECOM Transportation is the prime design consultant and EMI is a subconsultant of AECOM to provide geotechnical engineering for the design and construction of the interchange, which consist of new bridges, earth retaining structures, culverts, permanent cut and fill slopes, and pavement design for the project.

This Preliminary Foundation Memorandum presents draft findings from a geotechnical investigation conducted by Earth Mechanics, Inc. (EMI), preliminary foundation analysis and design, and construction recommendations for the proposed ramps improvement project on Yerba Buena Island, California.

### **1.2 PROJECT DESCRIPTION**

#### **1.2.1 Existing Facilities**

The existing local Macalla Road is one through lane each way and has a downgrade of about 9% within the project limits. Macalla Road is a major local arterial roadway between Treasure Island and the westbound on-ramp to the I-80 viaduct.

The existing I-80 bridge structure was constructed in the 1930's and consists of a reinforced concrete tunnel approach viaduct, a massive concrete abutment structure, and a steel viaduct, all with two decks of five lanes each.

A former timber staircase and associated concrete walkways steps and slabs have now been removed.

#### **1.2.2 Proposed Improvements**

The proposed improvements will replace the westbound on-ramp and off-ramps. The new bridge structures will connect Macalla Road with the new San Francisco-Oakland Bay mainline which is currently under construction as part of the East Span Seismic Safety Project by the California Department of Transportation. The new ramps will consist of two new multi-span precast prestressed concrete girder bridges branching off the new I-80 upper bridge deck and merging into a common bridge abutment at Macalla Road. The bridges will be supported by variable-height bent columns and a high-seat cantilever abutment. At the abutment, the new ramps will terminate with right and left-turn lanes.

The proposed structure (Alternative 2B) is divided in seven segments/design elements and proposed foundation types:

- The “Viaduct Structure Widening” supported on large-diameter Cast-In-Drilled Hole (CIDH) foundations,
- The “Transition Structure Widening at On-Ramp” supported on driven pile foundations,
- The “WB On-Ramp Structure” supported by 4 bents and an abutment on driven piles foundations,
- The “WB Off-Ramp Structure” supported by 5 bents and one abutment on driven piles foundations,
- The “Transition Structure Widening at WB Off-Ramp” involving 1 bent on driven pile foundation,
- Two retaining walls adjacent to the ramp abutments on driven piles, and
- A Retaining wall along south side of Macalla Road on spread footing.

Other major foundations are yet to be built in the area for the future I-80 Transition Structure and Final E/B On-Ramp. These foundations consist of large driven pile groups and will require temporary shoring for excavations and access roads. Construction of Transition Bent W7 to Abut W11 foundations are in progress as part of the YBI Transition Structures Advance Construction Package No. 2R0 (2007) and the YBITS#1 contract. Utility conduits and drainage devices are being and will be built in the sloping grounds between I-80 Transition Bents W7 and W9. A Caltrans Retaining Wall No. 6 is proposed in the sloping ground between Transition Structure Bents W7(L) and W8(L).



## 2.0 FIELD INVESTIGATION AND LABORATORY TESTING

### 2.1 EXISTING DATA REVIEW

The existing boreholes at or near a number of the proposed support points can be used for geotechnical foundation design if the new foundations do not require deeper penetration depths and provide sufficient information.

A series of soil and rock borings and cone penetrometer tests with seismic logging shown as "95-X" and "96-X" were performed by Caltrans in 1995 and 1996 primarily near the tunnel portal and along the existing bridge alignment for the Seismic Retrofit Project No. 19 of the existing viaduct (Caltrans, 1997).

Boreholes and Cone Penetrometer Tests designated as 98-X and 99-X were drilled in 1998 and 1999 for the SFOBB bridge replacement project. Borehole logs, laboratory test data, site characterization, and engineering properties are contained in the Fugro-EMI Site Characterization Report (2001).

Drilling was performed by PC Exploration of Rocklin, California and Pitcher Drilling of Palo Alto, California using Mobile B-80, Mobile B-53 and Failing 1500 truck-mounted drill rigs using rotary-wash and wireline core retrieval systems. Drilling in rock was performed using a 124 mm (4.8 in) tricone bit in soil and a HQ core barrel with 3.8 in (96 mm) outside diameter (OD) or NX core barrel with 76 mm (3 in.) OD in rock. A "Minuteman" hollow-stem-auger, tripod-mounted rig was used for steep hillside exploration. Soil and rock logging generally conformed to Caltrans 1996 logging guidelines (1996). Standard Penetration Tests (SPT) were performed in accordance with ASTM D 1586 using either standard rope-and-cathead technique and automatic-trip hammers. Soil samples were taken using the standard split spoon sampler and a modified California drive sampler consisting of a thin-wall brass ring-lined barrel with an outside diameter of 76 mm and an inside diameter of 73 mm.

CPT soundings were performed using an electronic cone penetrometer in general accordance with current ASTM Standards (ASTM D5778 and ASTM D3441). The CPT equipment consisted of a cone penetrometer assembly mounted at the end of a series of hollow sounding rods. The cone penetrometer assembly consisted of a conical tip with a 60° apex angle and a projected cross sectional area of 1.55 in<sup>2</sup> (10 cm<sup>2</sup>) and a cylindrical friction sleeve with a surface area of 23.25 in<sup>2</sup> (150 cm<sup>2</sup>). The interior of the cone penetrometer is instrumented with strain gauges that allow simultaneous measurements of cone tip and friction sleeve resistance during penetration. The cone penetrometer assembly is continuously pushed into the soil by a set of hydraulic rams at a standard rate of 0.79 inch per second (20 mm per second) while the cone tip resistance and sleeve friction resistance are recorded every 1.967 inches (50 mm) and stored in digital form. A specially designed all-wheel drive 25-ton truck provides the required reaction weight for pushing the cone assembly and is also used to transport and house the testing equipment. The computer generated graphical logs include tip resistance, friction resistance, and friction ratio. Soil behavior type interpretations are based on guidelines by Robertson and Campanella (1989).

Additional borings designated as "07-X" and "08-X" were performed in the slope areas for additional foundations and are documented in Addenda to the Site Characterization Report (Fugro-EMI, 2008).

## **2.2 FIELD INVESTIGATION**

### **2.2.1 Borehole Locations**

Site reconnaissance visits were conducted in July and August 2009 to plan the investigation, stake borehole locations, and mark and clear underground utilities. Borehole survey was provided by AECOM/Towill. A geotechnical field investigation was then conducted by EMI in August 2009 that consisted of drilling a total of 13 exploratory borings in the project area. The purpose of these borings was to determine subsurface conditions and collect samples of subsurface soils for the proposed bridge and wall foundations and for pavement design. Work was performed under a U.S. Navy permit provided by AECOM and a Caltrans encroachment permit rider obtained by EMI under a permit pulled by AECOM. Work was coordinated with AECOM, Caltrans Construction and Environmental Engineering, General Contractor C.C. Meyers, the Public Utilities Commission on Treasure Island, and Towill land surveyors.

Based on the experience during past foundation construction on the SFOBB Bridge Replacement Project, Caltrans direction was to characterize soil and rock conditions at each proposed support by an exploratory borehole to avoid or minimize construction issues and potential significant contractor claims. Caltrans also directed not to encroach into the Historical District area upslope of the Nimitz House. Based on this direction and geotechnical foundation design considerations, borehole locations were placed at or near proposed bridge foundations based on a number of considerations including need (lack of existing data), site accessibility, presence of existing structures and buried and overhead utilities, personnel safety concerns, fire hazard, and minimal impact on traffic and on-going construction operations. Most of the boreholes were in sloping ground and difficult access. Most (10) of the boreholes were deep and placed in the On-Ramp/Off-Ramp loop area and three shallow borings were placed behind the proposed retaining wall along Macalla Road.

### **2.2.2 Drilling and Sampling**

Drilling in soil was performed using the mud rotary-wash technique with 5-inch diameter auger. Soil sampling was performed to collect relatively undisturbed and disturbed samples for soil laboratory testing. California Drive sampler and a Standard Penetration Test (SPT) sampler were alternated at approximately 5 to 10 ft depth intervals. Soil samples were visually logged in the field following Caltrans Soil and Rock Classification Manual. Relatively undisturbed drive samples were obtained using a Modified California split-spoon sampler (3¼" outside diameter) lined with brass rings 1-inch long with 2.5-inch outside diameter and 2.4" inside diameter. Disturbed samples were obtained using a SPT sampler (1.4-inch inside diameter) without liners. Standard Penetration Tests (SPT) were performed in the borings generally at 5-foot depth intervals. Both samplers were driven into the ground using a 140-lb automatic-trip hammer free-falling 30 inches.

When rock was encountered, the drill equipment was converted to wireline core drilling using a triple-barrel coring system fitted with carbide bit or HQ-size diamond-impregnated bit tools and a



101-mm diameter geobore sampling. Rock cores were carefully handled, extruded on PVC shells for visual inspection and logging, then preserved using cellophane/shrink wrap to retain in-situ moisture and stored in sturdy wooden core boxes.

Hazardous materials (free product) or soil contamination was not observed or encountered during drilling. Aerially deposited lead sampling or testing is beyond the scope of this report.

## **2.3 LABORATORY TESTING**

Laboratory tests were performed to determine relevant physical characteristics and engineering properties of soils that exist at the site. Selected representative soil samples were tested to determine soil classification and physical and engineering properties.

The laboratory tests were conducted in general accordance with California Test Methods or American Society for Testing and Materials (ASTM) Standards.

## **3.0 GEOLOGICAL SETTING**

### **3.1 REGIONAL GEOLOGICAL STRUCTURE**

The project is located in the Coast Ranges geologic/geomorphic province of northern California. The Coast Ranges extend from approximately 300 miles from the Transverse Ranges province in the south to the Klamath Mountains about 250 miles to the north of the project site. The Coast Ranges province is bordered on the west by the Pacific Ocean and to the east by the Great Valley province. The Coast Ranges have a general northwest orientation and are characterized by north-northwest trending ranges and valleys.

The San Francisco Bay region comprises a northwesterly-oriented geomorphic depression called the San Francisco Bay-Santa Clara Valley (SFB-SCV) depression (Page, 1992). The SFB-SCV is bounded by the Santa Cruz Mountains to the southwest, and the East Bay Hills and Diablo Range to the northeast. The SFB-SCV depression and its bounding mountains all have relatively recent tectonic origin within about the past 3 or 4 million years (Page, 1992).

Although tectonic deformation continues today, the bulk of large-scale crustal folding and down-warping was near completion about 1 million to 500,000 years ago. At about 100,000 years ago the hills and valleys reached their present configuration and the present form of the bay could have been recognized (Page, 1992; Goldman, 1992).

The project site is between two major fault systems, the San Andreas fault west of the site and the Hayward fault system to the east. The San Andreas Fault is the boundary between the Pacific and the North American tectonic plates and juxtaposes the Jurassic/Cretaceous-age Salinian Block plutonic rocks against the Jurassic/Cretaceous-age Franciscan Complex. The Franciscan rocks are juxtaposed against the Great Valley Sequence which lies east of the Hayward fault.



The Franciscan Complex forms the basement rocks under most of the San Francisco Bay area, including the site area, and consists of sedimentary, metamorphic, and igneous rocks. These rocks are believed to have been accreted onto the North American plate during plate subduction that largely ended in the Miocene (Page, 1992). Although parts of the accreted assemblage form coherent, solid rock, most of the complex are intensely sheared and disrupted into a *mélange* of exotic blocks of basalt, chert, limestone, gabbro, blueschist, eclogite, and amphibolite that are embedded in a tectonic paste of sheared shale, sandstone, and serpentinite (Wahrhaftig, 1989). Deposited onto these basement rocks are Tertiary-age marine and non-marine sedimentary rocks such as the Contra Costa Group and Santa Clara Formations.

### 3.2 LOCAL GEOLOGY OVERVIEW

Yerba Buena Island is located within the San Francisco Bay, approximately 11 miles east of the San Andreas Fault and 8 miles west of the Hayward fault. Yerba Buena Island can be divided into four distinct topographic zones. These zones are the Main Island, Northeast Point which forms the small knoll at the northeast tip of the island, and the Saddle Area that forms the lowest part of the natural island between the Main Island and Northeast Point, and Treasure Island, the low-elevation man-made island on the north. The project area is on the northeast flank of the Main Island.

The island is underlain by Franciscan Formation basement rock consisting of interbedded graywacke sandstone, siltstone and claystone of varying proportions. The majority of the Franciscan Formation is covered with unlithified sand and localized areas of artificial fill. The unlithified sand is partially eolian (windblown) in origin (Schlocker, 1974) and partially weathered and decomposed Franciscan sandstone. The sand covers most of the bedrock on the island, except along the lower parts of the slopes where waves have cleaned the rocks, and on Northeast Point. Grading in the late 1930's at the Northeast point removed up to 50-60 feet off the top of the hill exposing slightly weathered bedrock. Areas of artificial fill surrounding the island, such as Treasure Island and the Coast Guard Station, were created by placing cut materials from Yerba Buena Island and dredged bay deposits.

Review of regional seismotectonics of the San Francisco Bay Area indicates that there are no known active faults in proximity of Yerba Buena Island and no historical earthquakes have been associated with fault rupturing on the island. Faulting and seismicity on the island are discussed in more detail in the YBI Site Geotechnical Characterization Report (EMI-Fugro, 2001).

### 3.3 LOCAL STRATIGRAPHY

The majority of the island is covered with unlithified alluvial deposits, along with localized areas of artificial fill. The unlithified material is primarily wind-blown sand and weathered decomposed Franciscan Formation.

The project site is characterized by the following four basic units:

- Artificial Fill (af),
- Sedimentary Deposits and Alluvium (Qs, Qal, Qb, Qc, Dbr),

- Landslide Deposits (Qls and Qols), and
- Bedrock of the Franciscan Formation (JKf).

These units are essentially the same as those found throughout the island as described in the YBI Site Geotechnical Characterization Report (EMI-Fugro, 2001). Table 3-1 provides a summary of site stratigraphy of units which are described in more detail in subsequent sections.

**TABLE 3-1. STRATIGRAPHIC INFORMATION**

UNIT NAME	APPROXIMATE AGE	DESCRIPTION
Artificial Fill (af)	<100 yrs	sand
Alluvium (Qa, Qal):	Holocene (< 10,000 yrs)	sand, silt and gravel; non indurated to weakly indurated.
Sandy Clay , Silty Clay, Clay (Qs, Qb, Qc, Qc/Db)	Late-Middle Pleistocene (10,000-300,000 yrs)	light brown, light gray decomposed mudstone, claystone, shale;
Salinian block granitics, Franciscan and Franciscan metavolcanics (JKf)	Jurassic/Cretaceous (144-206 my)	<b>Salinian block granitics</b> – granodiorite, quartz monzonite, quartz diorite, <b>Franciscan</b> – 25,000 ft thick bedded and massive graywacke, sandstone interbedded with thin-bedded to laminar claystone and siltstone, greenstone, blueschist, greenschist, serpentinized peridotite.

### 3.3.1 Artificial Fill

Fill occurs locally across the island as road base, foundation support, and landscaping soil. Fill also occurs as uncompacted cast-over or disturbed surficial slough from the various historical development activities. Along the many roads around the island, cast-over grading material from the road building activities overlies, and is gradational with, native slope-wash sedimentary alluvium. Artificial fill occurs along the island shoreline east and south of the Northeast Point at the Torpedo Building and Torpedo Road, and in the Coast Guard base in the southern Saddle Area. Most of the present U.S. Coast Guard Station is entirely on fill first placed around 1934.

The fill material within the Southern Saddle Area is up to about 30 feet thick. Exploratory excavation indicated the upper portion of the fill consists of brown to yellowish brown, moist, loose to medium dense, fine grained sands with some gravel. The lower portion consists of a coarser fraction composed of brown and gray sand and gravel material with large angular cobbles and boulders of the Franciscan Formation sandstone and siltstone.



### 3.3.2 Sedimentary Deposits

Sedimentary deposits are generally slopewash alluvium composed primarily of fine-grained sand and silty sand with a few scattered silt and clay lenses. The colors of the alluvium are shades of brown ranging from yellowish-brown, brown, brownish-yellow, and dark brown. The material is loose to very dense and generally moist except on the upper slopes where it is locally dry to moist. The deposits are thick-bedded to unbedded; where bedding occurs it is generally horizontal to dipping about 20 degrees.

The great thickness and fine-grained nature of the sands along with their poor grading and widespread distribution in pockets across the island suggests these materials originated as wind-blown sands similar to those occurring on much of the San Francisco Peninsula. Mixed in with the wind-blown deposits may be weathered-in-place siltstone and sandstone of the Franciscan Formation.

The bottom portion of the unlithified deposits generally consists of clay to sandy clay unit about 5 to 15 feet thick (denoted as Qc/Dbr). This clayey deposit is multicolored with shades of yellowish-brown and reddish-brown with gray, black, and white specks, streaks, and spots.

The clayey zone grades imperceptibly downward into sandstone but occasionally contains fragments of decomposed to weathered sandstone. The clays are typically stiff to hard. The gray areas are generally centered around tubular void spaces of 1 to 2 mm size which appear to be remnant root holes suggesting the material is a relict soil. These characteristics indicate that the unit is completely decomposed and altered Franciscan bedrock. In some cases, the material is intersected by white to black clay seams and planar features that appear to be relict bedding, joints, or veins, typical of those seen within the underlying bedrock. Occasionally, these features could be traced into the underlying rock.

The slope soils predominantly consist of medium dense to dense sedimentary alluvium of poorly-graded, fine-grained sands with varying amounts of silt. The alluvium is generally unbedded and massive. The alluvium is underlain by a layer of very dense clayey sand (at higher elevations) to hard sandy clay (at lower elevations) a few meters thick that represent the transition zone between soil and intensely to highly weathered Graywacke sandstone/siltstone/claystone of the Franciscan Formation. Two design soil profile cross sections are attached as identified in the site plan.

### 3.3.3 Landslide Deposits

A portion of the project area appears to have experienced shallow landslides. Similar but degraded slide scars can be seen on the slopes around the island indicating that these features have occurred in the past and are a recurring phenomenon. Landslides on YBI consist of two types: thin surficial soil slips and wedge failures involving Franciscan Formation bedrock. These landslides are generally small and occur where slopes have been over-steepened by erosion and excavations. The landslides within the site area appear to thin features similar to those observed throughout the island.

The poorly stratified nature of the unlithified sandy slope-wash and wind-blown deposits indicate that the predominant landsliding agent is reworking and remobilization by gravitational slope-wash processes. These processes comprise soil creep and landsliding. The landslides can be caused or



exacerbated during severe winter rains when the sands become saturated. For example, the intense rainfall during the winter of 1998-1999 resulted in several large shallow soil slips on the steep (about 40°) slopes above the Coast Guard base. Exposures in these slide scars revealed only massive deposits. These slides involved surficial sands of the Sedimentary Deposits. The depth of these slides was on the order of about 2 to 5 feet.

### **3.3.4 Bedrock**

The Jurassic/Cretaceous-age Franciscan Formation (JKf) forms the bedrock of YBI and underlies the surficial unlithified sediments. The Franciscan Formation is about 140 million years old and has a long history beginning with deposition in a deep ocean basin to uplifting to its present surface exposure.

The Franciscan formation consists of interbedded sandstone, siltstone and claystone. However, the formation within the YBI ramps area is predominantly thick-bedded to massive sandstone with only a few thin beds of claystone or siltstone. The few beds indicate bedding orientation dipping to the northeast consistent with outcrops and other borings on the island (EMI-Fugro, 2001). The rock is commonly soft in the upper 5 to 15 feet where it has been altered by weathering. These weathered rocks are generally brown. With increasing depth, weathering decreases, and the rocks become gray and much harder.

The rocks have abundant intersecting calcite veins which represent healed fractures. There are a few minor fractured zones. Tiny hairline fractures with tiny offsets are ubiquitous throughout the formation. These small fractures are largely intra-formational and commonly intra-stratal features that formed when the rocks were still soft sediment or only slightly lithified. Displacements on such features are generally on the order of millimeters or centimeters. These features are completely healed and may be tens of millions of year old and of no significance to the modern tectonic regime.

## **3.4 LOCAL GEOLOGICAL STRUCTURE**

The Franciscan Formation on Yerba Buena Island and the immediate surrounding area is unusually coherent compared to the formation in other parts of California which is composed of a highly deformed melange of ancient seafloor/trench deposits. The rocks are about 140 million years old and have undergone a long history of deformation beginning with uplift from the deep ocean basin to its present surface exposure. This history included subduction zone tectonics, perhaps several episodes of uplift, folding, and subsidence, and plate-boundary faulting.

There are abundant shear zones with minor displacements on the order of millimeters and centimeters within the Franciscan Formation bedrock. Several larger fracture zones and minor shear zones were encountered in boreholes and foundation excavations within the rocks of Northeast Point (EMI-Fugro, 2001). However, there are no known active faults in proximity of Yerba Buena Island (EMI-Fugro, 2001) and no historic earthquakes associated with fault rupturing on the island. Geophysical investigations north of the island revealed that offshore discontinuities are a result of dredging and filling activities and not faulting (EMI-Fugro, 2001). An onshore geophysical study suggested another zone of poor continuity within the Saddle Area, but detailed analysis of aerial photographs, geophysics, core samples, and down-hole video logs do not favor a fault origin.

Bedding within the bedrock of the island generally strikes about N50° to 60° W and dips about 20° to 70° to the northeast. In general, the dips are steepest in the central part of the island and decrease gradually toward Northeast Point where dips of 30° to 45° degrees are most common. Just offshore to the east of the point, bedding dips in the 20° to 45° range.

The rocks of the formation are highly fractured with fracture density generally in the 3 to 4 fractures per foot range, especially near the surface. The density of fracturing generally decreases with depth where most joints are healed with calcite cement. The rocks have abundant intersecting calcite and some quartz veins which represent healed fractures. There are abundant minor intensely fractured zones. Some of these fractures have slickensides and fresh appearing oxidation indicating slight reopening and water percolation at some later time. The orientation of the fractures is distributed throughout all quadrants of the compass without any dominant orientation (EMI-Fugro, 2001).

Tiny shears, generally hairline, and minor shear zones are ubiquitous throughout the rocks. These small shears are largely intra-formational and commonly intra-stratal features that formed when the rocks were still soft sediment or only slightly lithified. Displacements on such features are generally small fractions of an inch (on the order of millimeters or centimeters). These features are completely healed and may be tens of millions of year old and of no significance to the modern tectonic regime.

### 3.5 GROUNDWATER

No groundwater was encountered during the subsurface exploration as part of this study. Groundwater was not recorded during the present investigation due to the use of rotary-wash type of drilling. Groundwater was also not found in EMI's existing monitoring well monitoring well 08-1 at the time of investigation.

EMI-Fugro (2001) interpreted the natural groundwater table to be near sea level. However, significantly higher levels have been measured in the sediment cover in the central part of the island and these result from infiltration of surface run-off from seasonal rains on the higher elevations on YBI.

### 3.6 REGIONAL SEISMICITY

The geology of the San Francisco Bay is controlled by the northwest trending, right-lateral San Andreas fault system that is comprised of several major and minor fault strands with generally similar trends, deformation styles, and seismic histories. The fault system accommodates ~1.5 inches/year of relative dextral shear within the broad boundary (60-120 miles) between the Pacific and North American plates. In the vicinity of Yerba Buena Island, the San Francisco Bay-Santa Clara Valley block is bound by two major faults; the main trace of the San Andreas fault occurs approximately 10 miles to the west and the Hayward fault lies ~8 miles to the east. The sub-parallel San Andreas and Hayward faults strike ~N35°W to N37°W and cut through the crust at variably high angles. The San Andreas fault on the San Francisco Peninsula is relatively young strand that has undergone ~15 miles of right-lateral offset in the past 3.3-1.3 Ma (Parsons, et. al., 2002). The Hayward fault system, including the Hayward, Calaveras, Rodgers Creek, and Healdsburg faults, has undergone ~ 65 miles of cumulative offset in the past 12 Ma (Graymer, 2003).



In the southern San Francisco Bay block, the San Andreas fault is considered “locked” at the surface; strike-slip (lateral) motion along the fault occurs as (earthquake-generated) discrete seismic slip events. Slip rate estimates for the Bay area segments of the San Andreas fault are very uncertain, with credible values ranging from 15 to 25 mm/yr (Working Group on California Earthquake Probabilities, 2003).

The model for the Hayward fault suggests it is locked at variable depths from the surface to ~ 7.5 miles below the surface (Bürgmann et. al., 2000). Where the Hayward fault is locked at depth, movement occurs both as seismic and aseismic slip (distributed fault ‘creep’). Aseismic slip is an important component of the Hayward fault; in some creeping sections, greater than 50% of the long-term fault displacement is accommodated by aseismic slip and recent studies suggest that aseismic slip releases up to 25% of the seismic moment accumulating on the fault (Furlong et. al., 2003).

There is also a considerable amount of vertical displacement along fault zones in the southern San Francisco Bay. In the west, much of the vertical displacement occurs along folds and discrete thrust faults (e.g., the Monte Vista and Berrocal faults) located within a restraining bend in the San Andreas fault near the foothills of the Santa Cruz Mountains southeast of Palo Alto (Hitchcock and Kelson, 1999). In the east, vertical displacement is especially notable in the Mission Hills region where there is left step-over between the Hayward and Calaveras faults. Vertical offset on the Hayward fault system appears to be partitioned rather than discrete, occurring as oblique right-lateral slip. Relative to other areas in the San Francisco Bay-Santa Clara Valley block, the active uplift rates in both these regions are considered rapid and capable of producing large earthquakes such as the 1989 Loma Prieta earthquake ( $M_w$  6.9) (Bürgmann et. al., 2006) which had an epicenter in the southern Santa Cruz Mountains ~20 miles southeast of Yerba Buena Island.

Most historical seismicity in the San Francisco Bay region is associated with the major faults of the San Andreas fault system. A total of 15 earthquakes of moment magnitude ( $M$ )  $\geq 6.0$  have occurred in the San Francisco Bay region in historical times (1850 to present), including the 1868  $M$  6.9 Hayward, the 1906  $M$  7.9 San Francisco and the 1989  $M$  6.9 Loma Prieta earthquakes. Additionally, between 1808 and 1850, 4 large intensity earthquakes with moment magnitudes estimated between 6.0 and 6.8 occurred in the southern San Francisco Bay region.

### 3.7 GEOLOGIC HAZARDS

There are virtually no significant earthquakes on the island. Within the 40 or so years of high-resolution earthquake recording and roughly 1 million years for geology, the present San Francisco Bay domain has been essentially non seismic and appears to be responding to tectonic stress only by long-term regional tilting down to the south.

Faults are observable in the cut slopes and north shoreline of Northeast Point. These features were mapped and traced in core holes and foundation excavations, and were analyzed under the petrographic microscope. These studies indicated that the faulting in the YBI Northeast Point formed under conditions of relatively high confining pressure and elevated temperature, in the presence of silica and carbonate-bearing hydrothermal solutions. This faulting is believed to have occurred about 13 million years ago, and under conditions that no longer exist at YBI. Geophysical



surveys (EMI-Fugro, 2001) also show that none of the young sediment units in the area have been deformed, eliminating the possibility of Holocene fault activity.

It is therefore concluded that there is little hazard of tectonic faulting or other permanent local deformation to the project area. The long-term regional tilting down to the south of the San Francisco Bay domain is probably continuing, but at a rate that is so slow (approximately 0.1 mm/yr) that it is effectively imperceptible in the YBI area.

### 3.7.1 Landslides

In general, landslides are the downslope motions of earth materials including rock, soil, or both. Landslides can move by translational movement or rotational settlement or a combination of both. They are the result of the loss of ability of earth materials to maintain their integrity at a specific slope gradient. Subsequently landslides settle into a lesser gradient or state of greater equilibrium. The internal material strength is lost and the material then settles into a form where the mass is centralized on the downhill side of motion. Often landslides are associated with water because water increases the material unit weight and decreases the internal strength of the material. Landslides become increasingly more probable with increasing slope gradient, looseness of material, unfavorable bedding conditions (out of slope), clay content of bedrock, underground springs, unfavorable slope orientation with existing fault boundaries, human/artificial impacts and disturbances, increases in groundwater, earthquake forces, increases in water content and disturbances of the lateral confining forces and/or the portion of the slope.

The steep portions of the existing slopes south of existing I-80 have a history of surficial sloughing after wet periods up to about 3 m deep (detailed information including description, maps, photos, and references is provided in Section 6.3 of 2001 Fugro-EMI Site Characterization Report, and Section 4.3.1.1 and Plates 2 and 40-42 of the 2002 Fugro-EMI Foundation Report). Previous reports for the area discuss and document surficial sloughing and failures dating back to the 1930s, 1974, and during the wet season of 1997-1998. The last sloughing event occurred in the south portion of the slopes after ground saturation due to significant rainfall in early January 2006 and that portion has since been stabilized by extensive reinforced shotcrete facing. In addition, the sloping ground at Transition Bent W7 is being restored using geogrid-stabilized engineered backfill designed by Fugro-EMI.

Previously conducted slope repairs including the shotcrete slope facing seem to have worked well and prevented reoccurrence of failures, so far. The parts of the slope that have recently been involved with landsliding are probably now somewhat stable, but areas between old slides may still be unstable, and the steeper parts of the head scarps of the old slides should be expected to fail during the next period of prolonged heavy rainfall. Future excavations associated with the new SFOBB that create slopes steeper than the angle of repose (i.e. about 35°) may be subject to raveling, surficial sand flowage, and to shallow landsliding.

## **3.8 SEISMIC HAZARDS**

### **3.8.1 Soil Liquefaction**

Liquefaction is a phenomenon whereby saturated granular soils lose their inherent shear strength due to increased pore water pressures, which may be induced by cyclic loading such as that caused by an earthquake.

Liquefaction is more likely in clean, low-fines, poorly-graded, saturated, low-density sands. With increasing overburden, density and increasing clay-content, the likelihood of liquefaction decreases. In regards to clay content, recent studies over the past ten years has demonstrated that clays with certain properties can be prone to liquefaction. Other factors affecting the potential of liquefaction include but not limited to the following: magnitude and proximity of the earthquake; duration of shaking; soil types; grain size distribution; clay fraction content; density; angularity; effective overburden; cyclic loading; and soil stress history. Liquefaction is generally considered possible when the depth to groundwater is less than about 50 feet below the ground surface.

The subject site is underlain by competent medium dense to very dense silty sand and deep clay alluvium, particularly at depths where groundwater has been observed in few soil borings during wet seasons. Within the project area, the potential for soil liquefaction under these conditions is low and not considered a design issue.

### **3.8.2 Lateral Ground Spreading**

Lateral spread is the finite, lateral displacement of sloping ground ( $< 6\%$  percent) as a result of pore pressure buildup or liquefaction in a shallow, underlying soil deposit during an earthquake. Lateral spreading, as a result of liquefaction, occurs when a soil mass slides laterally on a liquefied layer and gravitational and inertial forces cause the layer and the overlying non-liquefied material to move in a downslope direction. The magnitude of lateral spreading movements depends on earthquake magnitude, distance between the site and the seismic event, thickness of the liquefied layer, ground slope or ratio of free-face height to distance between the free face and structure, fines content, average particle size of the materials comprising the liquefied layer, and the standard penetration rates of the materials. Due to a low site soil liquefaction potential, the potential for lateral spreading to impact the project corridor is low.

### **3.8.3 Fault-Related Ground Rupture**

In general terms, an earthquake is caused when strain energy in rocks is suddenly released by movement along a plane of weakness. In some cases, fault movement propagates upward through the subsurface materials and causes displacement at the ground surface. Surface rupture usually occurs along traces of known or potentially active faults, although many historic events have occurred on faults not previously known to be active.

The California Geologic Survey (CGS) establishes criteria for faults as active, potentially active or inactive. Active faults are those that show evidence of surface displacement within the last 11,000 years (Holocene age). Potentially active faults are those that demonstrate displacement within the



past 1.6 million years (Quaternary age). Faults showing no evidence of displacement within the last 1.6 million years may be considered inactive for most structures, except for critical or certain life structures. In 1972 the Alquist-Priolo Special Studies Zone Act (now known as the Alquist-Priolo Earthquake Fault Zone Act, 1994, or APEHA) was passed into law which requires studies within 500 feet of active or potentially active faults. The APEHA designs "active" and "potentially active" faults utilizing the same age criteria as that used by the CGS. However, the established policy is to zone active faults and only those potentially active faults that have a relatively high potential for ground rupture.

The project site is not located within any active fault zones as delineated by the APEHA. Localized faults are observable in the cut slopes and north shoreline of Northeast Point. These features were mapped and traced in core holes and foundation excavations, and were analyzed under the petrographic microscope. These studies indicated that the faulting in the YBI Northeast Point formed under conditions of relatively high confining pressure and elevated temperature, in the presence of silica and carbonate-bearing hydrothermal solutions. This faulting is believed to have occurred about 13 million years ago, and under conditions that no longer exist at YBI. Geophysical surveys (EMI-Fugro, 2001) also show that none of the young sediment units in the area have been deformed, eliminating the possibility of Holocene fault activity. Therefore, it is our professional opinion that the potential for surface ground rupture for the proposed project improvements is negligible.

#### **3.8.4 Potential for Ground Shaking**

The energy released during an earthquake propagates from its rupture surface in the form of seismic waves. The resulting strong ground motion from the seismic wave propagation can cause significant damage to structures. At any location, the intensity of the ground motion is a function of the distance to the fault rupture, the local soil/bedrock conditions beneath the structure, and the earthquake magnitude. Intensity is usually greater in areas underlain by unconsolidated material than in areas underlain by more competent rock. Earthquakes are characterized by a moment magnitude, which is quantitative measure of the strength of the earthquake based on strain energy released during the event. The magnitude is independent of the site, but is dependent on several factors including the type of fault, rock-type, and stored energy.

There are virtually no significant earthquakes on the island. Within the 40 or so years of high-resolution earthquake recording and roughly 1 million years for geology, the present San Francisco Bay domain has been essentially non seismic and appears to be responding to tectonic stress only by long-term regional tilting down to the south.



## 4.0 CONCLUSIONS AND RECOMMENDATIONS

### 4.1 IDEALIZED SOIL PROFILES AND ENGINEERING PROPERTIES

Based on the recent field exploration and the as-built LOTB sheets, idealized soil profiles were developed along the ramp and along Macalla Rd. station lines. Design soil and rock strength parameters for foundation design are presented in Table 4-1. The soil strength parameters are based on correlations with SPT blowcounts (Lam and Martin, 1986) and laboratory test results

**TABLE 4-1. IDEALIZED SOIL PROFILES AND STRENGTH PARAMETERS**

Predominant Soil Type	Range of SPT-equivalent Blowcount (blows/foot)	Total Unit Weight (pcf)	Friction Angle (degree)	Cohesion/Undrained Shear Strength (psf)
Medium dense Silty Sand and Sand with Silt	9 to >70 Average = 35	123	33 to 35	0 to 150
Dense to very dense Silty Sand, Sand with Silt, and Gravel	29 to >70 Average = 40	125	35 to 37	50 to 250
Hard Sandy Lean Clay	30 to >70 Average = 40	127	0	4,000
Weathered Franciscan Bedrock (Graywacke Sandstone and Siltstone)	-	127	35	500

### 4.2 SEISMIC DESIGN CRITERIA

EMI's Seismic Ground Motion report for this project (EMI, 2001) provides site-specific design spectra and ground motions for the seismic design events adopted by Caltrans for the SFOBB East Span bridge replacement project.

According to the current Caltrans Seismic Hazard map, the most significant faults relative to the project area are listed in TABLE 4-2 along with their style of fault, maximum earthquake magnitude, distance to the bridge site and resulting peak bedrock acceleration (PBA). The dominant earthquake sources for the YBI Ramps Project are the Hayward fault at 7.6 miles east of the project site and the San Andreas faults at 10.4 miles west of the project site.

Based on the deaggregated hazard, the seismic hazard at the bridge is dominated by a magnitude 7.8 event at 18 to 21 km distance on the San Andreas fault and a magnitude 7.0 event at 9 to 12 km distance on the Hayward fault. The deaggregated hazard also showed that at the 1,500-year return period, the controlling earthquakes would be associated with forward rupturing events. Therefore, the time histories should represent large magnitude earthquakes at short distances with forward fault rupturing.

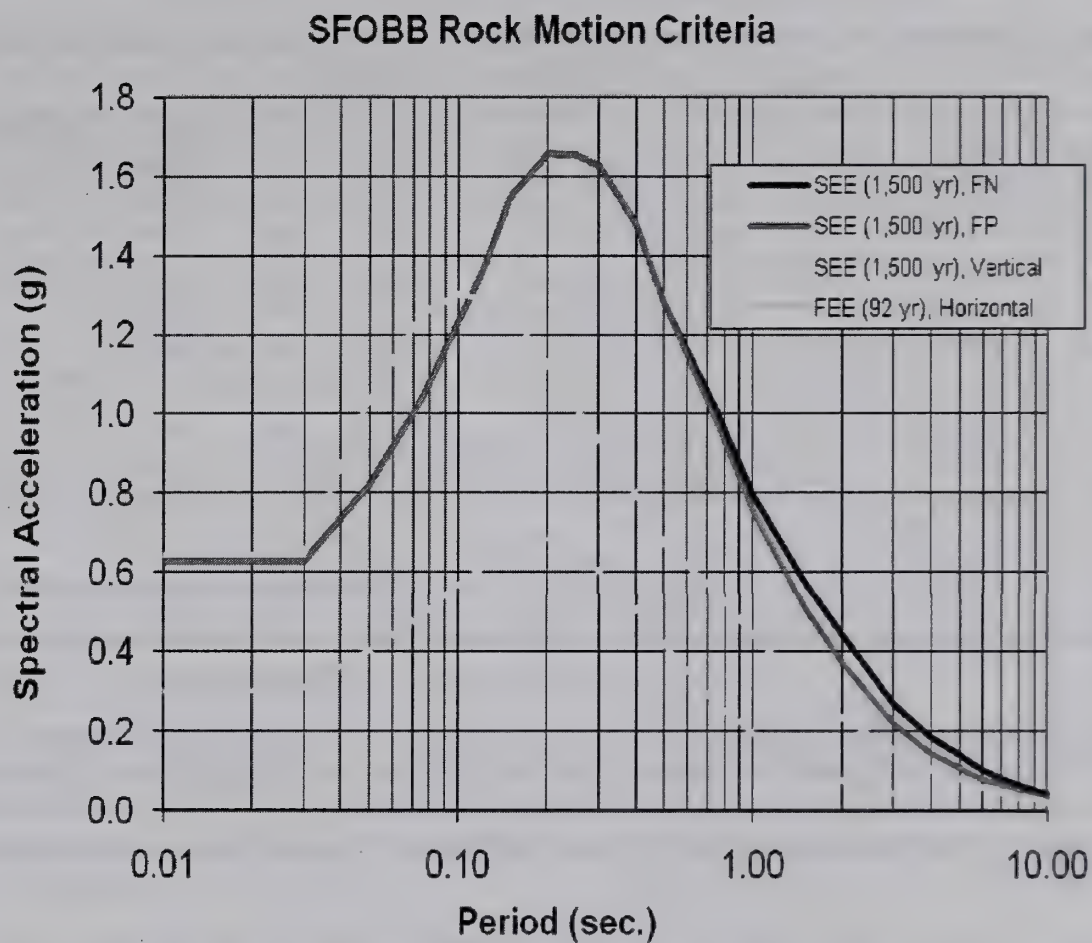
Seismic design criterion for the project site is referenced from comprehensive ground motion report conducted for Cal Trans as part of the Bay Bridge East Span Project (2001). The ground motion criterion is a probabilistic approach recommended by the Ad Hoc Committee on Ground Motions. The committee recommended a 1,500-year mean return period for the Safety Evaluation Earthquake (SEE), corresponding to a 10-percent probability of exceedance over the 150-year expected life span of the East Span structures. The overall strike angle for both the San Andreas and the Hayward faults is about N35°W. Therefore, the fault normal and fault parallel directions are N55°E and N35°W, respectively. The 1500-year hazard results were deaggregated (fault normal, fault parallel and vertical) and show that the hazard is dominated by the San Andreas and Hayward faults. The SEE motions for all three components (fault normal, fault parallel, and vertical) at YBI are shown in Figure 4-1.

The appropriate ground motion criteria for design at a functional earthquake performance level (minimal damage; Functional Earthquake Event, FEE) were discussed between Caltrans and the Peer Review Panel. Due to the long design life of 150 years and the high activity rate for the San Andreas and the Hayward faults, Caltrans selected a 92-year return period earthquake for the functional event corresponding to a 50 percent probability of experiencing up to 2 earthquakes within the 150-year design life. Figure 4-1 presents the 92-year return period equal hazard spectrum for the fault normal component rock motion. The FEE was defined as a magnitude 6.5 event on the Hayward fault.

**TABLE 4-2. LOCAL SEISMIC SOURCES**

<b>Fault or Fault Zone</b>	<b>Style of Faulting</b>	<b>Maximum Credible Earthquake (MCE) Magnitude</b>	<b>Distance to Site<sup>(1)</sup> (miles)</b>	<b>Peak Bedrock Acceleration<sup>(2)</sup> (g)</b>
San Andreas Fault	Strike Slip (RLSS)	8.0	10.4	0.6
Hayward Fault	Strike Slip (RLSS)	7.3	7.6	0.3

**FIGURE 4-1. 2001 FUGRO-EMI SEE ROCK SPECTRA FOR SFOBB EAST SPAN  
REPLACEMENT PROJECT AT YBI**



Source: EMI, 2001



### 4.3 SOIL CORROSIVITY

A total of seven soil samples were tested for pH, minimum resistivity, soluble chloride content, and soluble sulfate content. The test results are summarized in Table 4-3.

**TABLE 4-3. SOIL CORROSION TEST RESULTS**

Boring No.	Sample No.	Depth (ft)	Soil Type	Minimum Resistivity (ohm-cm)	pH	Sulfate Content (ppm)	Chloride Content (ppm)
09-01	D-7	35.0	SILTY SAND (SM)	18,000	7.66	20	305
09-02	S-9	45.0	SILTY SAND (SM)	7,500	8.39	20	194
09-04	D-14	64.0	SANDY lean CLAY (CL)	2,900	7.57	100	282
09-06	S-13	64.0	Lean CLAY with SAND (CL)	1,000	7.59	400	336
09-07	D-12	59.0	SANDY lean CLAY (CL)	2,500	7.52	200	447
09-10	D-10	50.0	SILTY SAND (SM)	2,300	8.18	20	376
09-10	D-20	100.0	SILTY SAND (SM)	5,900	8.67	20	209

Caltrans Corrosion Guidelines (2003) classify soil as corrosive if the soluble chloride content is less than 500 ppm, the soluble sulfate content is less than 2,000 ppm, and the pH value is 5.5 or higher. Based on the combined test results and these Caltrans criteria, the on-site soils are not considered to be corrosive to bare metals and concrete in contact with the on-site soils at the proposed foundations locations.

The subject site is located within in a marine environment defined in the Caltrans Corrosion Guidelines as a site located within 1,000 ft of brackish water. For steel piles, sacrificial corrosion allowance is required per Caltrans' Corrosion Guidelines (2003), Section 10.1. Minimum concrete cover reinforcement should be in accordance with Table 8.22.1 of the Caltrans BDS (2005) for "Corrosive soil above MLLW level with chloride concentration between 500 and 5,000 ppm." For the above measure pH value and sulfate concentration, cement type should be in accordance with Table 8.22.1 of the Caltrans BDS for "Sulfate concentration from 0 to 1,499 ppm." Additional corrosion protection requirements for structural members are given in Section 8.22 of the Caltrans BDS.

### 4.4 EXISTING FOUNDATION DATA

The foundations of the two ramps will be adjacent to or near existing foundations or future foundations which are currently under construction as part of the YBITS#1 contract. The existing I-80 bridge has been demolished and its foundations were cut down to levels that do not interfere with new foundation construction. The new on-ramp will join the I-80 bridge along the north side of the

west viaduct. The new off-ramp will divert from the I-80 bridge at Bent W5L. The pile data for these adjacent foundations is summarized below:

**TABLE 4-4. CLOSEST AS-BUILT FOUNDATION DATA**

Support Location	Pilecap Bottom El. (m)	Foundation Type	Service Demand (tons)	Spec. Tip El. (m)
Bent W10AL (North Col.)	+42.6	HP14x132*	80	+32.0
Bent W10L (North Col.)	+43.0	HP14x132	80	+31.5
Bent W9L (North Col.)	+41.2	HP14x132	80	+30.0
Bent W8L (North Col.)	+34.1	HP14x132	80	+21.0
Bent W7L (North Col.)	+21.6	HP14x132	80	+8.0
Bent W6L	+6.6	HP14x132	75	-11.5
Bent W5L	+6.1	HP14x132	75	-10.5

Note: HP14x132\* is HP 360x132 metric; 80 tons is 1,450 kN; 75 tons is 1,350 kN.

#### 4.5 PILE FOUNDATION DESIGN

The proposed structure (Alternative 2B) is divided in six segments/design elements. The following summarizes the segments and proposed foundation types:

- The “Viaduct Structure Widening” supported on large-diameter Cast-In-Drilled Hole (CIDH) foundations,
- The “Transition Structure Widening at On-Ramp” supported on driven pile foundations
- The “WB On-Ramp Structure” supported by 4 bents and an abutment on driven piles foundations,
- The “WB Off-Ramp Structure” supported by 5 bents and one abutment on driven piles foundations,
- The “Transition Structure Widening at WB Off-Ramp” involving 1 bent on driven pile foundation,
- Two retaining walls adjacent to the ramp abutments on driven piles, and
- A Retaining wall along south side of Macalla Road on spread footing.

This section discusses feasible foundation types, presents pile foundation design, evaluate pile slope stability, and develop recommendations for ramp abutment design.

#### 4.5.1 Foundation Type

To meet structural demands and due to high peak bedrock accelerations at the project site, deep foundations are required. Selection of the foundation type at each location involves consideration of existing structures (buried or above-ground), ground condition, noise, vibration, constructibility (e.g., caving soils, dense soils, rock), site accessibility by and availability of construction equipment, and cost. Driven steel piles and Cast-in-Drilled-Hole (CIDH) piles are feasible foundation types at all support locations. Considerable construction experience exists in the area in regards to both foundation types. The project borders a designated Historical District which includes the General Nimitz building located near ramp Bents 7 and 8. CIDH may be a preferred type if vibration and noise is to be minimized, however, three large pile groups consisting of steel HP14x132 sections were successfully driven to date at the Transition Structure Bent W7 site. In general, there is sufficient fines in the alluvial soils to preclude the potential of caving within the granular soils during construction of the CIDH piles. A single occurrence of soil caving in the first large diameter CIDH pile was dealt with per project specifications. The use of CIDH piles precludes the use of battered piles to resist lateral loads and as a result requires larger diameters to meet lateral demands. Due to lack of soils susceptible to soil liquefaction, pile downdrag under seismic loading condition is not a design issue for either pile type. Pile interaction is a design issue for new piles adjacent to the new I-80 structure foundations.

Unless extraordinary high lateral loads demand the use of large diameter CIDH piles or space limitation precludes the construction of a pile cap, driven piles are recommended for the project.

Based on the above site evaluations, three special issues need to be considered for foundation design:

- Per Caltrans' Corrosion Guidelines (2003), Section 10.1, the corrosion rate of 0.004 inch per year for a 75-year design life needs to be used for estimating the sacrificial metal loss, or the use of protective coatings and/or cathodic protection. As H-pile can corrode from both sides, no commonly available sections can accommodate the required 0.6 inch of sacrificial thickness. Consequently, protective coating on standard H-piles can be considered.
- To avoid potential damage on the existing 12'x12' culvert located next to the proposed Bent 3 foundation during pile installation, pre-drilling to 2 feet below the culvert bottom (estimated at about El. + 464.5 feet) is recommended for Bent 3 piles. The skin friction in the pre-drilling zone is ignored in estimating Bent 3 pile lengths.

#### 4.5.2 Bridge Foundation Design

The viaduct widening will be on 72" CIDH Type-1 cantilever shafts. The ramp abutments will be seat-type supported by a retaining wall on driven HP piles. The bents will be on HP piles and 24" diameter CIDH piles. The selected foundation types are summarized in TABLE 4-6 for the On-Ramp, and TABLE 4-7 for the Off-Ramp.

Per Caltrans policy, the Load and Resistant Factor Design (LRFD) method is used for bent piles and the Working Stress Design (WSD) is used for abutment piles. The foundation design data and foundation loads provided by the structural designers are shown in Table 4-5 to Table 4-7.



### 4.5.3 Axial Capacity

The abutment foundations were designed using working stress design (WSD) per Caltrans policy (2008) using the maximum permanent axial load per pile for the service limit state. The required nominal resistance per pile is twice the maximum compression load. The analysis took into account group effects considering adjacent foundations.

The bent foundations were designed using load factor resistance design (LRFD) per Caltrans policy (2008) using the maximum factored loads per pile for the strength limit state or extreme limit state. The required nominal resistance per pile is the maximum demand divided by a resistance factor (0.7 for strength limit, 1.0 for extreme event limit). The piles were designed for a maximum pile-head settlement of 1/2 inch under service loading. The analysis takes into account group effects considering adjacent foundations.

The HP piles were designed using FHWA methods and American Petroleum Institute criteria (API, 1993) to estimate skin friction and end-bearing resistances. Pile group effects based on the layout provided by AECOM and the guidelines published in the AASHTO LRFD Bridge Design Specifications (2007) were included in these results. The ultimate axial capacity of the CIDH piles was determined using the Reese and O'Neill method (1989) addressed in the Caltrans BDS.

The design nominal resistances (ultimate geotechnical pile capacity), and resulting design and specified pile tip elevations are presented in the Pile Data Tables for the contract plans **TABLE 4-6** for the On-Ramp and **TABLE 4-7** for the Off-Ramp foundations. The capacities are based on soil resistance only and may be limited by the pile-head connection details and the strength of the pile material.

TABLE 4-5. FOUNDATION DESIGN DATA

Location	Method	Pile Type	Design Finish Grade El.*** (m)	Pile Cut-off El. (m)	Pile Cap Size (m)		Total Permissible Settlement (inch)	Number of Piles
Viaduct Structure Widening at On-Ramp								
Col. Bent 39*	LFD	1.8 m CIDH	+51.7	+51.1	NA	NA	1	1
Col. Bent 40*	LFD	1.8 m CIDH	+51.7	+51.1	NA	NA	1	1
Col. Bent 41*	LFD	1.8 m CIDH	+51.9	+50.1	NA	NA	1	1
Col. Bent 42*	LFD	1.8 m CIDH	+51.3	+50.1	NA	NA	1	1
Col. Bent 43*	LFD	1.8 m CIDH	+51.2	+50.0	NA	NA	1	1
Col. Bent 44*	LFD	1.8 m CIDH	+49.3	+48.8	NA	NA	1	1
Transition Structure Widening at WB On-Ramp								
Bent 10AL**	Conventional	HP360x132	+48.1	+45.0	7.42	8.25	1	42
Bent 10L**	Conventional	HP360x132	+46.5	+45.0	5.85	10.65	1	45
Bent 9L**	Conventional	HP360x132	+42.2	+40.625			1	54
WB On-Ramp Structure					*FROM CALTRANS' FILE			
Bent 8**	Conventional	HP360x132	+28.9	+29.0			1	
Bent 7**	Conventional	600mm CIDH	+27.3	+25.0			1	
Bent 6*	LFD	HP360x132	+30.6	+26.0	10.65	9.45	1	68
Bent 5*	LFD	HP360x132	+38.3	+36.0	8.25	7.05	1	42
Abut 4*	WSD	HP360x132		+45.0			1	
Wing Walls*	WSD	HP360x132					1	
Transition Structure Widening at WB Off-Ramp								
Bent 5L**	Conventional	W360x196		+7.325	8.25	8.25	1	49
WB Off-Ramp Structure								
Bent 6**	Conventional	HP360x132	+11.5	+8.125	11.85	11.85	1	100
Bent 7**	Conventional	600mm CIDH	+20.6	+17.575	10.65	10.65	1	64
Bent 8**	Conventional	600mm CIDH	+23.9	+21.975	9.45	9.45	1	49
Bent 9*	LFD	HP360x132	+29.2	+22.4	10.65	9.45	1	68
Bent 10*	LFD	HP360x132	+37.8	+34.0	8.25	7.05	1	42
Abut 11*	WSD	HP360x132		+45.35	15.36	3.9	1	
Retaining Walls*	WSD	HP250x62					1	

Notes:

\*Design by AECOM

\*\*Design by Moffatt Nichol

\*\*\*Measured at lowest point of CIDH or pilecap

TABLE 4-6. PILE DATA TABLE FOR ON-RAMP STRUCTURES

Location	Pile Type	Design Loading (kN)	Nominal Resistance (kN)		Pile Cut-Off El. (m)	Design Tip El. (m)	Specified Tip El. (m)
			Compression	Tension			
Viaduct Structure Widening at On-Ramp							
Col. Bent 39*	1.8 m CIDH	-	6,000	0	+51.1		
Col. Bent 40*	1.8 m CIDH	-	8,850	0	+51.1		
Col. Bent 41*	1.8 m CIDH	-	9,800	0	+50.1		
Col. Bent 42*	1.8 m CIDH	-	9,800	0	+50.1		
Col. Bent 43*	1.8 m CIDH	-	8,550	0	+50.0		
Col. Bent 44*	1.8 m CIDH	-	6,050	0	+49.8		
Transition Structure Widening at WB On-Ramp							
Bent 10AL**	HP360x132	-	1,450	725	+45.0	+32.0 (a) +34.5 (b) ____ (c) +39.0 (d)	+32.0
Bent 10L**	HP360x132	-	1,450	725	+45.0	+31.5 (a) +34.5 (b) ____ (c) +38.0 (d)	+31.5
Bent 9L**	HP360x132	-	1,450	725	+40.625	+31.5(a) +32.6(b)	+31.5
WB On-Ramp Structure							
Bent 8**	HP360x132	-	1,450	725	+29.0	+19.5(a) +20.5(b)	+19.5
Bent 7**	600 mm CIDH	-	1,800	900	+25.0	+12.5(a) +14.0(b)	+12.5
Bent 6*	HP360x132	-	1,450	725	+26.0	+16.0(a) +17.0(b)	+16.0
Bent 5*	HP360x132	-	1,450	725	+36.0	+26.0(a) +27.0(b)	+26.0
Abut 4*	HP360x132	600	1,200	0	+45.0	+35.0(a)	+35.0
Wing Walls*	HP360x132	200	400	0			

**Notes:**

\*Design by AECOM

\*\*Design by Moffatt Nichol

- Design tip elevation is controlled by the following demands: (a) Compression, (b) Tension, (c) Settlement, and (d) Lateral Load.
- The specified tip elevation shall not be raised above the design tip elevations for cases (c) and (d).



TABLE 4-7. PILE DATA TABLE FOR OFF-RAMP STRUCTURES

Location	Pile Type	Design Loading (kN)	Nominal Resistance (kN)		Pile Cut-Off El. (fm)	Design Tip El. (m)	Specified Tip El. (m)
			Compression	Tension			
Transition Structure Widening at WB Off-Ramp							
Bent 5L**	W360x196	-	1,450	725	+7.325	-3.6(a) -1.6(b)	-3.6
WB Off-Ramp Structure							
Bent 6**	HP360x132	-	1,450	725	+8.125	-1.9(a) -1.2(b)	-1.9
Bent 7**	600 mm CIDH	-	1,800	900	+17.575	+6.6(a) +7.8(b)	+6.6
Bent 8**	600 mm CIDH	-	1,800	900	+21.975	+11.0(a) +13.8(b)	+11.0
Bent 9*	HP360x132	-	1,450	725	+22.4	+11.4(a) +14.4(b)	+11.4
Bent 10*	HP360x132	-	1,450	725	+34.0	+23.0(a) +25.0(b)	+23.0
Abut 11*	HP360x132	600	1,200	-	+45.35	+35.9(a)	+35.9
Retaining Walls*	HP250x62	200	400	-			

## Notes:

\*Design by AECOM

\*\*Design by Moffatt Nichol

1. Design tip elevation is controlled by the following demands: (a) Compression, (b) Tension, (c) Settlement, and (d) Lateral Load.
2. The specified tip elevation shall not be raised above the design tip elevations for cases (c) and (d).

## 4.5.4 Lateral Pile Resistance

Lateral pile analyses were performed using the computer program BMCOL76 (Matlock, et al., 1981). For the Abutments, analyses were performed for pinned connections at the pilecap and taking into account any group effects. The lateral soil springs (p-y curves) for this analysis were generated using American Petroleum Institute criteria (API, 1993). Results of lateral pile analysis in terms of pile-head shear and lateral deflection for a free-head condition are presented in Table 4-8. The maximum bending moment and the location of maximum moment are also presented. Design criteria for the service condition required a maximum allowable lateral displacement of 1/4" at the pile top and 1" for the seismic load case. The solutions presented in the tables are entirely based on soil resistance and linear pile material properties. Therefore, these values may be limited by the flexural strength (plastic moment) of the piles and other connection details. Linear interpolation can be used for solutions between pile-head deflections shown.

## 5.0 CONSTRUCTION RECOMMENDATIONS

### 5.1 EARTHWORK

#### 5.1.1 Cuts

Excavations will be required for construction of the bent pilecaps and bridge abutments. On-site soils can be excavated and ripped with conventional earth moving equipment. The volume change of the on-site soils upon excavation and compaction will vary with the soil type and density encountered.

Earthwork should be performed in accordance with Caltrans Standard Specifications, Section 19 (Caltrans, 2006c). Appropriate measures should be taken to prevent damage to adjacent structures and utilities. The contractor shall conform to all applicable occupational and health standards, rules, regulations, and orders established by the State of California. In addition, other State, County, or Municipal regulations may supersede the recommendations presented in this section. If a trench shoring design and safety plan is required, the geotechnical consultant should review the plan to confirm that recommendations presented in this report have been applied to the design. If a trench shoring design and safety plan is required, qualified geotechnical personnel should review the plan to confirm that recommendations presented in this report were used in the design or provide additional recommendations.

Any design and construction of temporary sloping, sheeting, or shoring should be made the contractor's responsibility. Temporary excavations must be sloped or shored in accordance with all applicable codes and regulations including the most recent OSHA standards. Based on the data interpreted from the borings, design of temporary slopes and benches may assume a CAL/OSHA Soil Type C. Shoring may be required if space does not allow slope excavations. The design should meet Caltrans Trenching & Shoring Manual (1990) for temporary shoring. Open excavations should be designed such that they do not adversely impact adjacent structures and slopes. No excavations should be performed below an imaginary plane inclined at 45 degrees from the edge of any existing foundation without providing adequate support for the existing foundation.

For initial design and cost estimating purposes only, shoring retaining free-draining soil can be designed assuming a unit weight of 120 pcf, a friction angle of 30 degrees, and zero cohesion. For a cantilevered shoring that retaining level ground, a minimum lateral earth pressure of 36 pcf equivalent fluid pressure can be used. For braced shoring retaining level ground, an appropriate trapezoidal design lateral earth pressures with a  $30H$  psf value (where  $H$  is the depth of cut) can be assumed. Lateral pressures due to surcharges and any hydrostatic pressures should be added to the above lateral earth pressures. The earth pressures given above must be confirmed during construction based on actual shoring location, site-specific subsurface conditions, and ground and wall configuration.

Groundwater was not encountered below existing grade at the proposed bridge support locations based on past investigations described in Section 2.0. Groundwater levels could be higher in the rainy season. Therefore, groundwater is not expected to be encountered during pilecap construction. However, groundwater level can fluctuate due to seasonal rainfall, local irrigation and groundwater



recharge program and other man-made conditions. If groundwater is encountered, it should be controlled in accordance with Section 19-3.04 of the Caltrans Standard Specifications (2006c).

Soil or other construction materials should not be stockpiled adjacent to excavations. Stockpiles should be set back a distance which is at least equal to the height of the excavation.

During construction, qualified geotechnical personnel should inspect temporary slopes for erosion and sloughing, and should inspect temporary shoring for signs of instability and deformations.

For spread footings (above-ground pump station structure) and slab-on-ground concrete pads (ancillary equipment), existing soil beneath the footings and pads should be overexcavated to a minimum depth of 2 feet (relative to the bottom of footings and pads) and replaced with fill compacted to at least 95 percent relative compaction. The overexcavations should extend laterally at least 2 ft outside the footings and concrete pads.

Vegetation on existing ground should be removed prior to fill placement. Loose, soft, dry, wet, or otherwise unsuitable materials should be removed from areas that will receive compacted fill. All areas to receive fill should be observed to be firm and unyielding prior to fill placement. If pumping or yielding of the subgrade is observed during construction, appropriate measures should be taken by the contractor to stabilize the subgrade prior to placing compacted fill.

#### **5.1.2 Fills**

Prior to placing any compacted fill, the exposed ground surface should be scarified to a minimum depth of 8 inches, moisture conditioned as necessary to near optimum moisture content, and compacted to at least 95 percent relative compaction. Fill should be placed in uniform horizontal loose lifts not exceeding 8 inches thick, moisture conditioned to near optimum moisture content, and compacted to at least 95 percent relative compaction. If hand-directed mechanical tampers are used for compaction, the loose lift thickness should not exceed 6 inches.

Areas that are excavated below finish grade or that are disturbed due to construction activities should be overexcavated to undisturbed material. Finish grades should be reestablished using fill properly compacted to a minimum of 95 percent relative compaction.

Compacted fill should be monitored, inspected, and tested by qualified geotechnical personnel during grading to verify degree of compaction. Field and laboratory tests should be conducted in accordance with ASTM or Caltrans methods, and any other applicable testing requirements.

#### **5.1.3 Finished Slopes**

According to design information, the finished slopes will have a steepest gradient of 2H:1V. Slopes constructed with a gradient of 2:1 or flatter should be surficially stable. The following remedial alternatives are presented for slope areas that have not suffered severe erosion to date, but that are susceptible to erosion and surficial instability over time. The following alternatives are intended to improve long-term surficial stability of the slope within the project area.



Unpaved slopes with 1.5H:1V gradient are susceptible to erosion and surficial instability over time. The following recommendations are provided to improve long-term surficial stability of the slope within the project area. The upper 3 ft of soils below the finished slope face should have a minimum internal friction angle of  $32^\circ$  and minimum cohesion of 250 psf. If the in-situ soils encountered do not meet these properties, they should be excavated to a minimum depth of 3 ft relative to the finished slope face and replaced with select material having an internal friction angle of at least  $32^\circ$  and cohesion of at least 250 psf. The select material should be properly keyed and benched into the exposed sloping ground.

Soils should be placed in uniform horizontal loose lifts not exceeding 8 inches in thickness, moisture-conditioned to near-optimum moisture content, and compacted to at least 90 percent relative compaction. Relative compaction should be based on maximum densities determined using Caltrans Test Method 216.

Drainage control and proper maintenance with erosion protection are recommended in accordance with Section 20 of Caltrans Standard Specifications (2006c).

## **5.2 PILE CONSTRUCTION**

### **5.2.1 Driven Piles**

Piles should be driven at least to the specified tip elevation and the bearing value should be checked with the pile-driving formula given in Section 49-1.08 of the Caltrans Standard Specifications (2006c) using the nominal driving resistance or with a pile driving analyzer (PDA). However, if the specified tip elevation is reached without achieving the design load, pile driving should continue until bearing is attained. In this case, it may be prudent to allow the pile to "set up" before continuing the driving.

The selected pile-driving hammer such as diesel-type hammers should be able to deliver sufficient energy to drive the piles at a penetration rate of not less than 1/8 inch per blow at the required bearing value. Vibratory hammers and undersized pre-drilling below the embankment fill are not allowed for pile installation.

Drivability of piles was considered for the bridge site. Based on the available soil boring data, hard driving may be encountered above the specified pile tip. However, driving steel H-Piles is not anticipated to be difficult with a proper choice of equipment.

### **5.2.2 Drilled Piles**

The CIDH piles can be constructed in accordance with Section 49-4 of the Caltrans Standard Specifications (2006c) and using Type V cement. Based on conditions encountered during the geotechnical investigation, groundwater can be expected during drilling of the CIDH piles at all support locations and the Contractor should be prepared to deal with ground water during construction. For this case, "wet" construction using slurry displacement method is likely.



Due to the presence of water-bearing granular soils, caving may occur during construction of the CIDH piles. The Contractor may elect to use temporary casing to control any soil caving. The CIDH pile contractor should be experienced in installing closely spaced piles in confined space. Caltrans standard practice for "wet" construction includes PVC tubings installed within the reinforcement cage for gamma-ray (GGL) testing.

Adjacent piles should not be constructed concurrently. Pile boreholes should be inspected and approved by the qualified engineer prior to the installation of reinforcement. Extreme care in drilling, placement of steel, and the pouring of concrete is essential to avoid excessive disturbance of pile boring walls. Concrete placement by pumping or tremie tube to the bottom of the pile borings is recommended. Specifications should require that sufficient space be provided in the pile reinforcing cage during fabrication to allow the insertion of a tremie tube for concrete placement. The pile reinforcing cage should be installed and the concrete pumped immediately after drilling is completed.

### **5.3 ABUTMENT WALLS**

#### **5.3.1 Backfill**

Per Caltrans requirements, expansive soils should not be placed as part of the embankment within the limits of a bridge abutment as shown in Figure 5-1. Materials placed behind abutment wall should be low-expansive soil with an Expansion Index (EI) less than 50 and Sand Equivalent (SE) of more than 20. The low-expansive material requirement should be supplemental to the abutment structure and pervious backfill requirement as described in Caltrans Standard Plans (2006d) and Caltrans Standard Specifications (2006c) under Sections 19-3.06 and 19-3.065, respectively.

Backfill should be compacted in accordance with Section 19-5 of the Caltrans Standard Specifications (2006c). Backfill should be placed in loose lifts not exceeding 8 inches in thickness, moisture-conditioned to near optimum moisture content, and compacted to at least 95 percent relative compaction. The relative compaction should be based on the maximum density determined by California Test 216. Jetting or flooding to compact backfill is not recommended. Heavy compaction equipment, such as vibratory rollers, dozers, or loaders, should not be used adjacent to the abutment walls in order to avoid damaging the walls due to large lateral earth pressures.

#### **5.3.2 Backdrains**

Backdrains should be installed behind abutment walls to relieve hydrostatic pressure. Backdrains should be constructed in accordance with Bridge Detail 3-1 on Sheet BO-3 per Caltrans Standard Plans (2006d) or the geocomposite drain alternative per Section 6 of the Caltrans Bridge Design Aids (1992b) or perforated plastic pipe surrounded by gravel and wrapped in filter fabric placed near the bottom of the wall with adequate outlets (weepholes).







